



PY G 45/4.17/8

No. 187

Progress Report 187

1974

OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1973

William S. Lytle

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES

BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY

Arthur A. Socolow, State Geologist

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PENNSYLVANIA GEOLOGICAL SURVEY

FOURTH SERIES

HARRISBURG

1974

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ABSTRACT

Leasing for oil and gas exploration and development continued at a brisk pace during 1973. The two Medina (Lower Silurian) gas discoveries in southwestern Venango County caused a flurry of leasing from the discovery area northwest to Lake Erie, covering the northwestern corner of the State. Seismic activity was down from the 263 crew-weeks during 1972 to 161 crew-weeks in 1973 in 26 counties, with most of the activity being Vibroseis, costing the operators about \$2,400,000. Compared with 1972, oil well completions remained the same, but gas well completions increased 62 percent. Oil production decreased, whereas oil reserves, gas production and gas reserves increased. The price of new and stripper crude oil went up \$3.69 per barrel during the year, while a gas price increase continued to spread with prices ranging from 32 to 60 cents per Mcf.

The total number of highlight wells decreased from 86 in 1972 to 69 in 1973. The most active gas area was in Indiana County with 312 new wells, up 152 wells from 1972. Venango and McKean Counties were the most active oil areas with 205 and 126 wells drilled respectively.

Pennsylvania grade crude oil production amounted to 3,206,000 barrels, while production of Corning grade crude was 76,000 barrels or 2,000 barrels less than in 1972. Shallow gas production increased 7 percent to 66,713 MMcf, and deep gas was down 3 percent to 11,801 MMcf. Gas storage capacity increased to 783,450 MMcf, and stored gas reserves increased 7 percent to 647,041 MMcf.

Other wells completed, including service, gas storage and old well workovers, decreased 22 percent in 1973. The total of all wells reported in 1973 was up by 134 wells, or 11 percent greater than the 1972 total.

Of the 1,099 primary wells reported, 99 were exploratory and 1,000 were development. This is a 50 percent increase in exploratory wells and a 20 percent increase in development wells from 1972. Exploratory completions were 44 percent successful and development completions 96 percent successful.

Exploratory footage was up 57 percent and development footage 40 percent from that of 1972. The average depth of all wells was 2,327 feet, 369 feet deeper than in 1972.

Secondary and tertiary recovery projects remained active. The increase in the price of crude should make the Marcellus tertiary operation a profitable recovery process.

INTRODUCTION

Progress Report 178, *Representative Gamma-ray Logs from Shallow and Deep Wells, Western Pennsylvania* should be referred to for stratigraphic information. This publication contains three shallow gamma-ray logs (two from the oil belt and one from the gas fields), and one deep gamma-ray log on which shallow and deep producing intervals have been designated.

Wells with good completions or of special note for other reasons in the Commonwealth in 1973 are commented on in Part I of this annual report. Part II contains the statistics and review of industry activities for the year, and Part III is the summarized records of the 1973 deep wells.

ACKNOWLEDGEMENTS

The writer acknowledges the cooperation of the Bradford District Producers Association, the Pennsylvania Game Commission, the American Gas Association, the American Petroleum Institute, Petroleum Information, and the Pennsylvania Department of Environmental Resources Bureau of Land Protection and Reclamation (Oil and Gas Division) and Bureau of Forestry (Division of Minerals).

Appreciation is extended to operators and companies who released natural gas production statistics and other data.

PART I. COMPLETION HIGHLIGHTS FOR 1973

SHALLOW HIGHLIGHTS

The lower limits of initial production used in considering a shallow well (Upper Devonian or younger) as a highlight well were established at 50 bopd or more and/or over 2 MMcfgpd.

There were 68 shallow highlight wells reported in 1973. The decrease from 84 reported in 1972 was primarily due to the operators' failure to report the wells' initial production to the regulatory agency. The shallow highlight wells composed 6.2 percent of the total exploratory and development wells reported (Table 5). Table 1 gives highlight well statistics.

Figure 1 shows the distribution of the highlight wells. The following is a brief description of those highlight occurrences about which information was released through the Oil and Gas Division of the Bureau of Land Protection and Reclamation.

Pre-Speechley Gas Development

The pre-Speechley (Upper Devonian Zone B) development gas play in the west-central part of the State increased considerably over that of 1972. In this area there were 405 gas wells drilled in a five-county area compared

to 239 drilled in 1972. Most of this increase in number of gas wells was in Indiana County. The number of highlight gas wells completed in this zone increased from 12 gas wells in 1972 to 29 in 1973. The following wells were completed with potentials in MMcfgpd: Clearfield County in the Grampian field 2.1, Salem pool 2.8 and 2.9; Indiana County in the Creekside field 2.4, Jacksonville 2.0, 2.4, Juneau 2.1, Lewisville 2.6, 2.8, Lochvale 2.1 (2), Marchand 2.2, Marion Center 3.0, 4.8, Plumville 2.0, 5.0, Richmond 2.0, 2.1, 2.2, 2.5, 2.6, Saltsburg 2.2, 2.7, Smicksburg 2.0, Warner Hill 2.6, Willet 4.4, 5.9; Jefferson County in the Juneau 2.6; and Westmoreland County in the Blairsville 2.0. No highlight gas wells from this zone were reported from other counties.

Figures 2, 3, 4, 5, 6 and 7 are concerned with natural-gas-producing zones in 6 wells and their production of natural gas since completion. These wells are located in the shallow gas fields of Armstrong, Indiana and Westmoreland Counties. The relative position of the producing sands can be seen in Figure 2. All of the sands except the Bayard Stray are in the Upper Devonian Canadaway Formation, whose stratigraphic position is just below the "Pink Rock" of the Conneaut Group, also Upper Devonian in age. The Bayard Stray occurs in the upper part of the Conneaut Group. The names of the producing sands shown on the illustrations are those given by the operators. The numbers on the logs in Figures 3 to 5 also appear in Figures 6 and 7, indicating the gas production curve for the particular well.

Four highlight oil wells were reported from this zone as follows, with potentials in bopd: McKean County, Lewis Run pool 65, 75, Cooper 75, and in Forest County, Dawson Run 50 (pre-Speechley and Speechley).

Table 1. Shallow and Deep Highlight Well Statistics

	1973			1972		
Fields with highlight wells	27			19		
Counties with highlight wells	8			7		
Producing Zones	Wells			Wells		
	Gas	Oil	Total	Gas	Oil	Total
Oriskany	1	0	1	0	0	0
Pre-Speechley in Zone B*	29	3	32	12	10	22
Speechley or younger in Zone B*	0	36	36	0	63	63
Zone D*	0	0	0	0	1	1
Totals	30	39	69	12	74	86

* Zone of Upper Devonian rocks established in Progress Report 178

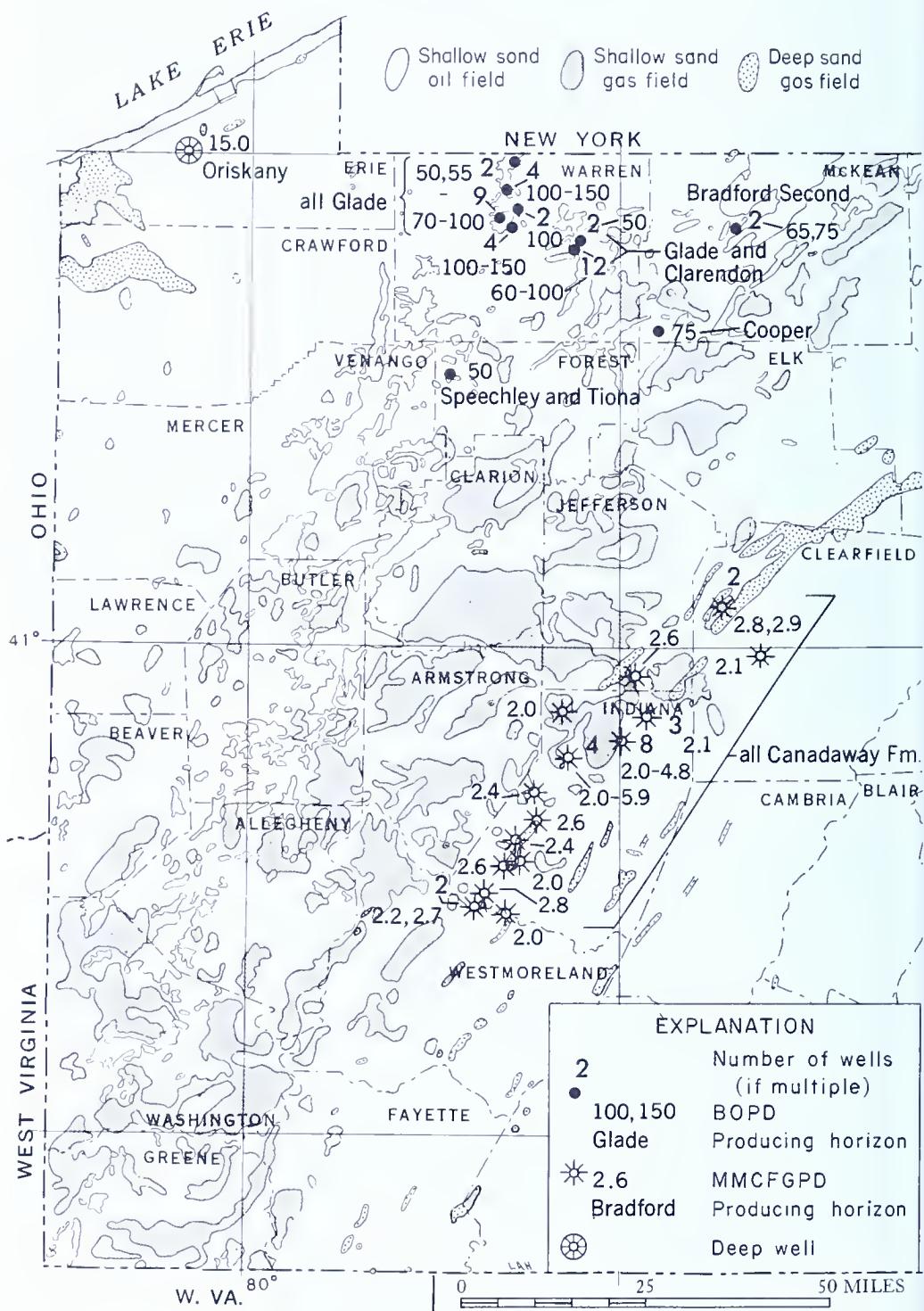


Figure 1. Highlight wells reported in 1973.

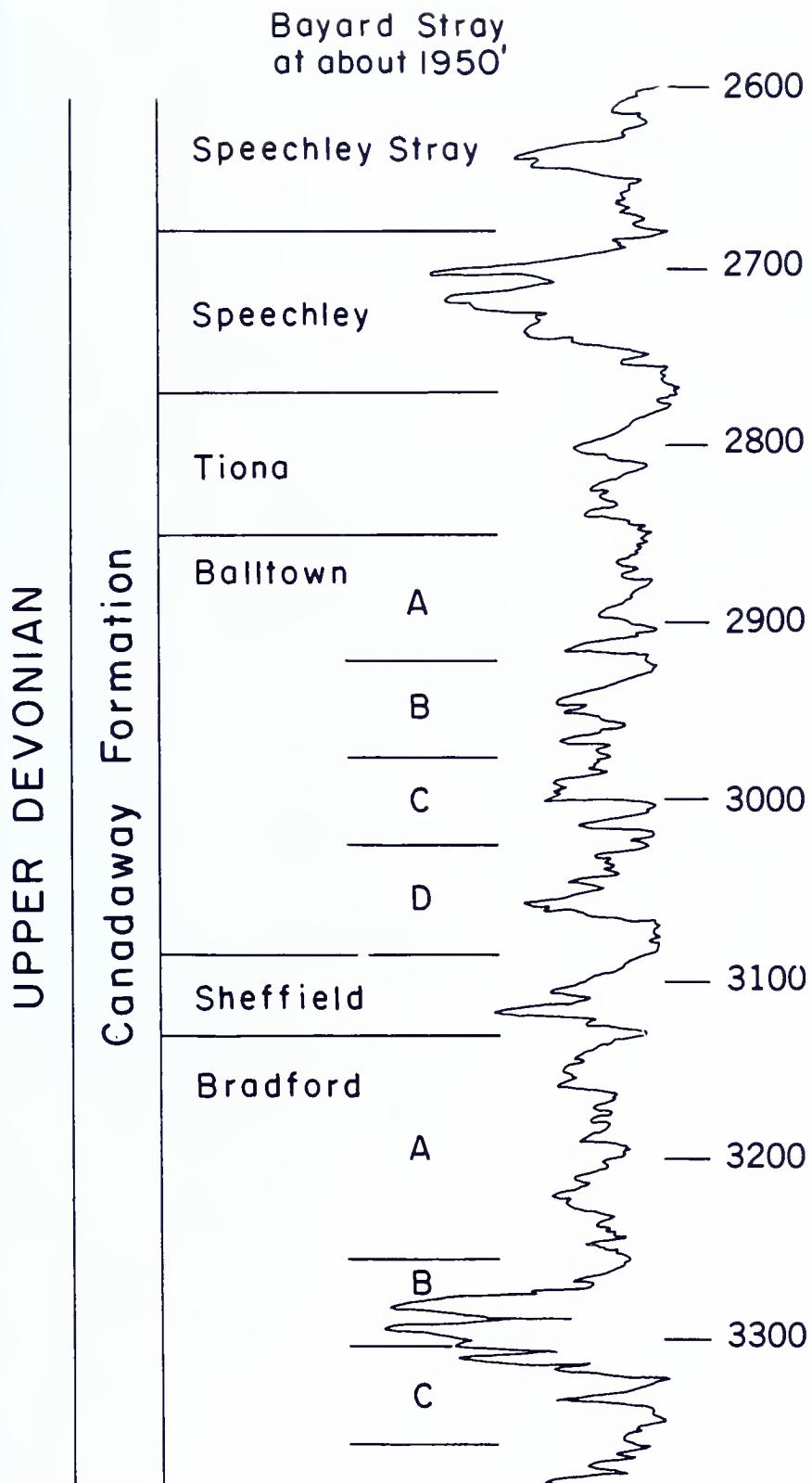


Figure 2. Composite section of gas sands with names used by operators
(see Figures 3-7).

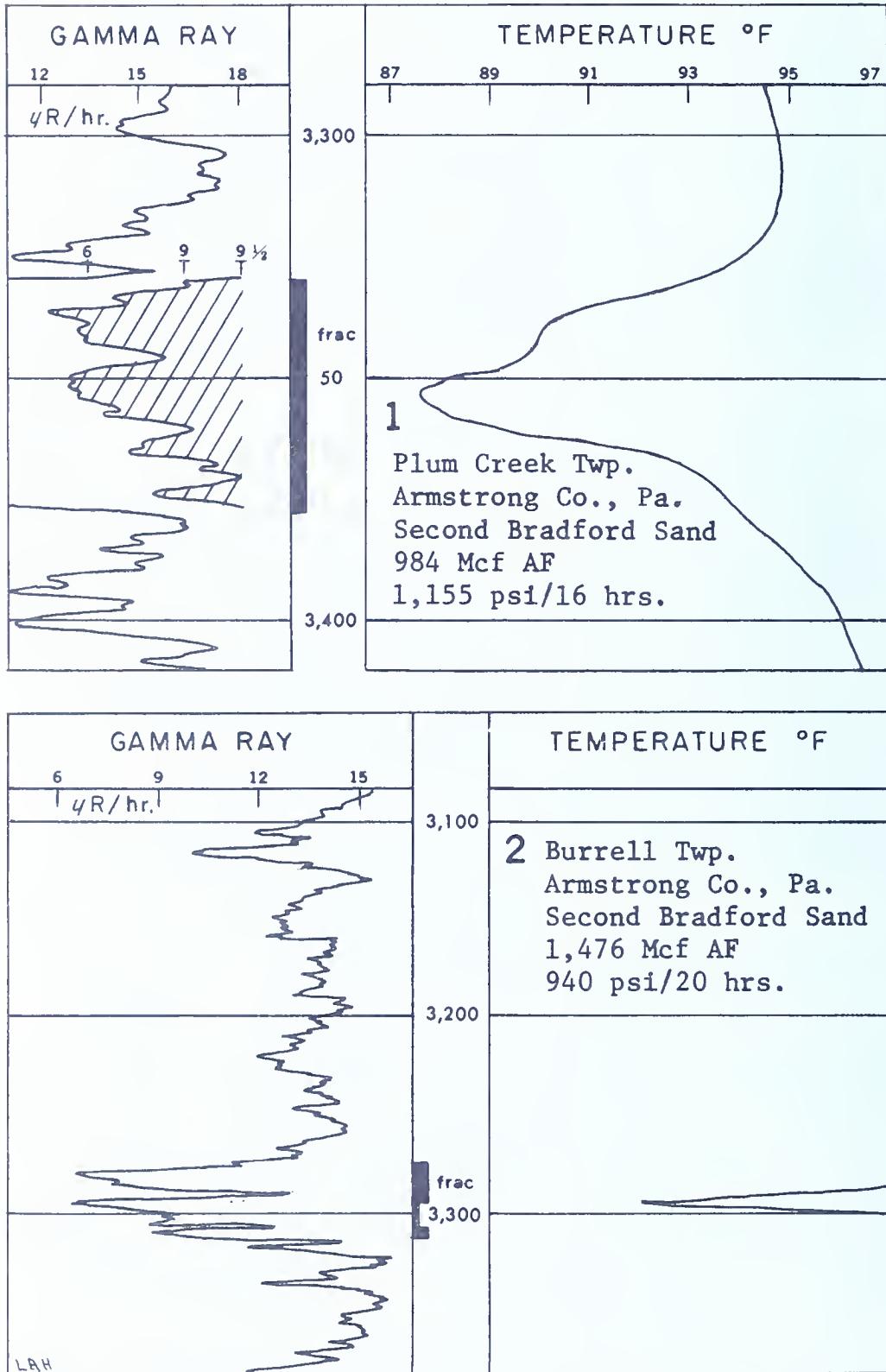


Figure 3. Mechanical logs of Armstrong County wells
(also see Figures 2 and 6).

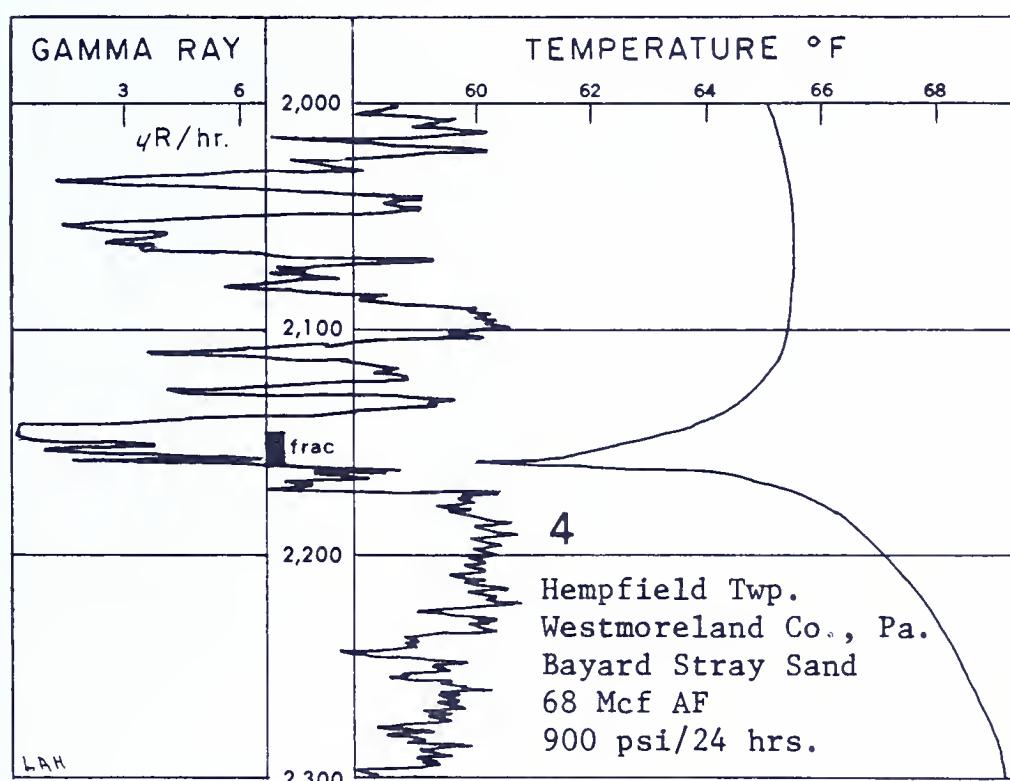
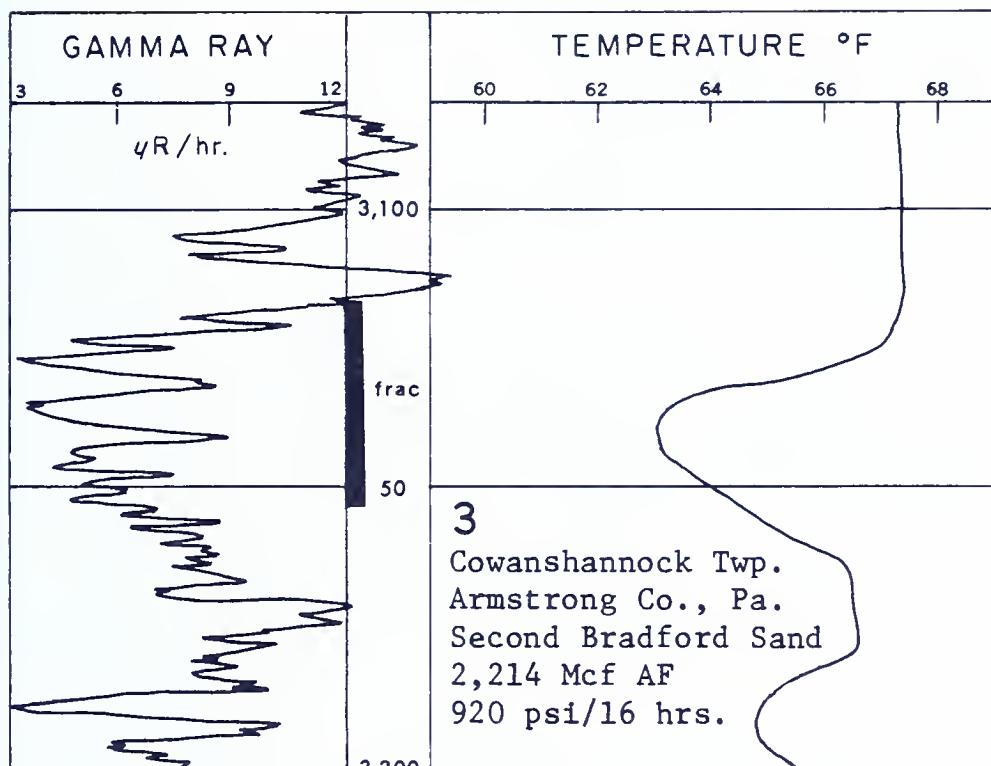


Figure 4. Mechanical logs of wells in Armstrong and Westmoreland Counties (also see Figures 2 and 7).

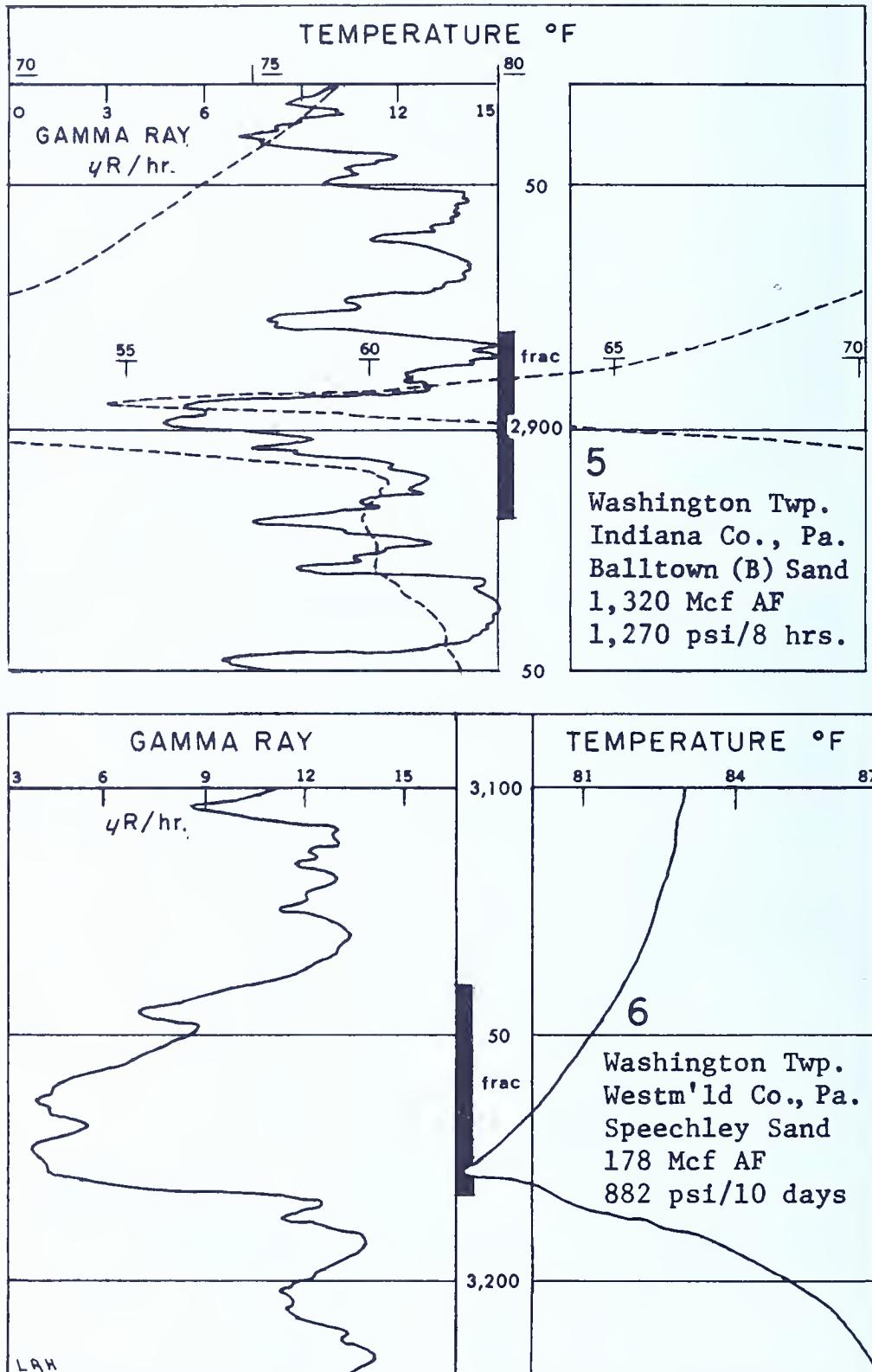


Figure 5. Mechanical logs of wells in Indiana and Westmoreland Counties (also see Figures 2, 6 and 7).

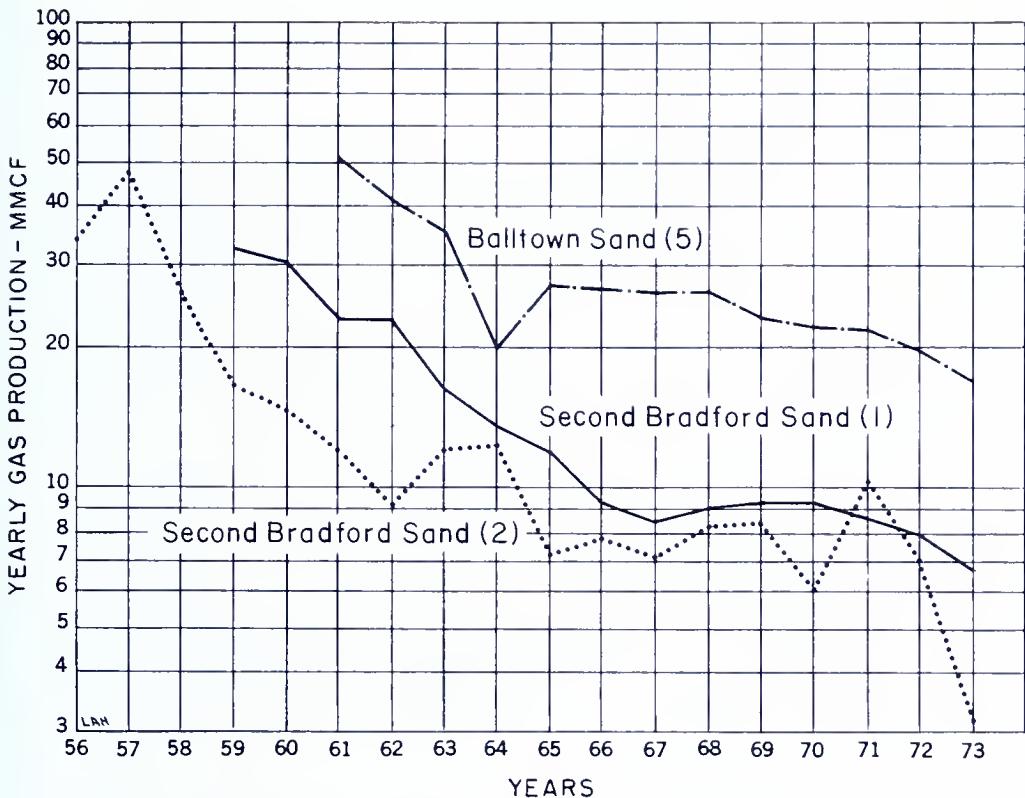


Figure 6. Production curves of wells whose mechanical logs are shown in Figures 3 and 5.

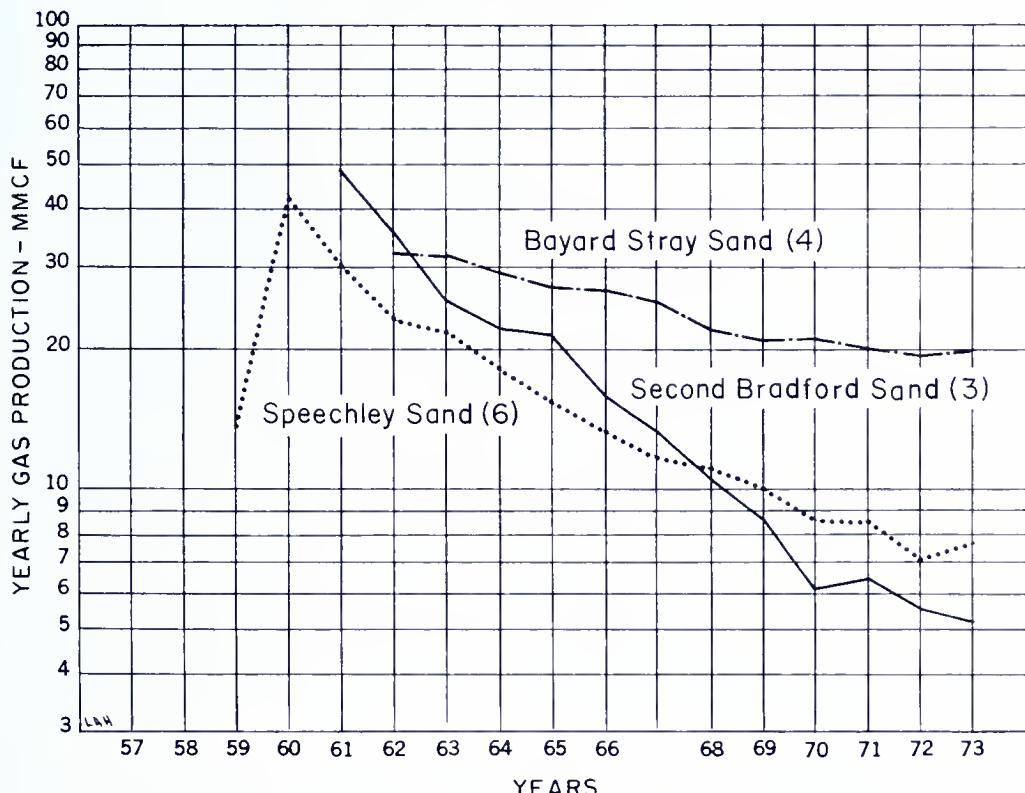


Figure 7. Production curves of wells whose mechanical logs are shown in Figures 4 and 5.

Glade Sandstone Oil Development

The rest of the crude oil highlight wells (35 wells) are located in Warren County and produce from the Glade sand of the lower part of the Conneaut Group (Upper Devonian). Below are shown the fields in which the wells are located and their initial productions in bopd: Chandlers Valley with 4 wells 100 to 150, Glade with 2 wells 50, Irvine Run 100, Morrison Run with 12 wells 100, Sugar Grove 50, 55, Yankee-bush 100, Youngsville with 13 wells 70 to 150.

DEEP HIGHLIGHTS

The lower limit for deep highlight wells is 10 MMcfgpd for a gas well and 50 bopd for an oil well.

The McKean field discovery (Figure 1; Figure 8, well 62) in Erie County was the only field with a deep highlight well. The discovery well, #1 Joseph R. McLaughlin, had a potential of an estimated 15 MMcfgpd from the Oriskany sandstone.

PART II. OIL AND GAS INDUSTRY ACTIVITY FOR 1973 BASIS FOR STATISTICS

Local industry statistics herein reported are consistent with figures submitted to national industry organizations. Consequently, drilling and completion data are entirely based on drillers' records and location plats forwarded to the Pennsylvania Geological Survey by the Oil and Gas Division of the Bureau of Land Protection and Reclamation of the Department of Environmental Resources, the administrative and regulatory agency for the Oil and Gas Laws. Only those wells for which records and plats have been received within the year are reported. This includes wells drilled in prior years for which records were submitted and received in 1973. It does not include 1973 wells completed for which records had not been submitted within the year.

Oil production and reserve data were obtained from the American Petroleum Institute and gas production and reserve data were obtained from the American Gas Association.

PREVIOUS COMPILATIONS

The summarized records of deep wells (those which reach rocks of Middle Devonian age or older) are shown in Table 14 and the locations of all exploratory wells are on Figure 8 (centerfold). For those deep wells drilled prior to 1950, the summarized records and other information on the Commonwealth's oil and gas activities are to be found in Mineral Resource Report 31 (Pennsylvania Geological Survey). Similar informa-

tion for the 1950 to 1954 period was published in Mineral Resource Report 39, and for the 1955 to 1959 period in Mineral Resource Report 45. For the years 1960 through 1971, this information was published annually in Progress Reports 158, 160, 165, 166, 168, 172, 173, 175, 177, 181, 183, 184 and 186 of the Pennsylvania Geological Survey. Oil and gas developments in the shallow sands (Upper Devonian or younger) are described in Mineral Resource Report 45 and in Progress Reports 135, 139, 143, 144, 147, 150, 151, 154, 155, 157, 158, 160, 165, 166, 168, 172, 173, 175, 177, 181, 183, 184 and 186.

A list of deep-well samples on file with the Survey was published in the Survey's *Catalogue of Deep Well Samples and Geophysical Logs to January 1, 1959* (W. R. Wagner, Inf. Circ. 16). Supplemental lists were published in Progress Reports 157, 158, 160, 165, 166, 168 and 173. These and other deep and shallow well samples, geophysical logs, and other well data are also on file with the Survey. An inventory of all deep and shallow well samples is brought up to date annually. It is available on request at cost of reproduction from the Survey's Pittsburgh office.

INDICATED STATUS OF LOCAL INDUSTRY

Oil well completions, 516 in 1973, remained about the same as 1972 with 518. Pennsylvania Grade crude oil production decreased 5 percent, and oil reserves increased 6 percent to 38,837,000 barrels. The API committee increased the crude oil reserves for some areas in the Commonwealth for the following reasons: 1) price increase, 2) greater activity, and 3) stabilization of production, Bradford District. Corning Grade crude oil production declined to 76,000 barrels.

Gas well completions increased 62 percent, from 297 wells in 1972 to 482 wells in 1973. Completion of wells classified as oil and gas wells declined 44 percent, from 16 in 1972 to 9 in 1973. Reserves of gas increased 6 percent, while production increased 6 percent. The amount of gas in storage increased 7 percent.

Drilling and Completions

The breakdown of completions by county is shown in Table 2, and the old wells drilled deeper in Table 3.

Table 4 shows that drilling for oil and gas increased 22 percent in 1973 over that in 1972. During the year exploratory and development drilling increased 50 and 20 percent respectively from those of 1972, as shown on Table 5.

The total footage in 1973 was up 40 percent with respect to the amount drilled in 1972 (Table 6).

Table 2. Well Completions in Pennsylvania, 1973*

County	TOTAL		GAS		OIL		OIL & GAS		DRY	
	No. of Wells	Aver. Depth (feet)	No. of Wells	Aver. Open-Flow (Mcfgpd) (feet)	Total Depth (feet)	No. of Wells	Aver. Production Depth (feet)	Total Flow (Mcfgpd) (boepd)	Aver. Depth (feet)	No. of Wells (feet)
Armstrong	37	3,862	37	812	3,862	0	0	0	0	0
Bedford	1	11,597	0	0	0	0	0	0	0	1
Bradford	2	7,669	0	0	0	0	0	0	0	2
Butler	4	1,752	2	88	2,150	2	1,355	0	0	0
Cambria	4	4,003	3	778	4,001	0	0	0	0	1
Cameron	5	6,679	2	1,059	6,708	0	0	0	0	3
Clarion	3	2,830	1	220	1,037	0	0	1	1,000	1
Clearfield	29	3,569	21	833	3,616	0	0	0	0	8
Crawford	10	3,762	3	667	3,943	1	770	5	150	22
Elk	20	3,340	10	422	3,715	2	1,744	0	0	0
Erie	6	3,037	2	8,107	4,121	0	0	0	0	4
Fayette	1	4,513	0	0	0	0	0	0	0	1
Forest	95	1,045	6	104	1,599	82	**	825	3	679
Fulton	1	3,572	0	0	0	0	0	0	0	1
Indiana	317	3,630	312	1,004	3,623	0	0	0	0	5
Jefferson	25	3,592	21	732	3,442	0	0	0	0	4
McKean	149	1,833	10	209	2,339	126	**	1,690	0	0
Mercer	3	3,966	1	454	5,335	1	10	904	0	0
Potter	6	6,577	0	0	0	0	0	0	0	6
Somerset	1	9,800	0	0	0	0	0	0	0	1
Susquehanna	1	8,534	0	0	0	0	0	0	0	1
Tioga	4	5,396	0	0	0	0	0	0	0	4
Venango	217	919	4	2,243	5,451	205	**	803	0	8
Warren	97	968	0	0	95	48	971	0	0	2
Washington	2	4,024	1	1,480	4,566	0	0	0	0	1
Westmoreland	14	3,547	14	603	3,547	0	0	0	0	0
TOTAL	1,054	2,395	450	946	3,611	514	**	1,061	9	421
										22
										3,048
										81
										4,031

* Does not include service wells, miscellaneous wells, gas storage wells, stratigraphic/core tests or old wells drilled deeper.

** Initial productions for majority of wells not given.

Table 3. Old Wells Drilled Deeper in Pennsylvania, 1973

County	TOTAL			GAS			OIL			DRY		
	No. of Wells (feet)	Aver. Amt.	No. of Wells	Aver. Init.	No. of Open-Flow (Mcfdpd)	Aver. Amt.	No. of Wells	Production (bopd)	Aver. Init.	No. of Wells	Aver. Amt.	No. of Wells
Armstrong	9	1,078	6	173	1,536	0	0	0	0	3	163	
Clarion	2	88	1	565	100	0	0	0	0	1	77	
Clearfield	1	2,244	1	581	2,244	0	0	0	0	0	0	
Elk	4	342	1	818	469	0	0	0	0	3	299	
Fayette	1	1,285	1	15	1,285	0	0	0	0	0	0	
Indiana	17	864	14	951	1,029	0	0	0	0	3	93	
Jefferson	6	537	5	551	633	0	0	0	0	1	57	
McKean	2	885	0	0	0	2	14	885	0	0	0	
Westmoreland	3	2,060	3	738	2,060	0	0	0	0	0	0	
TOTAL	45	903	32	666	1,158	2	14	885	11	164		

Table 4. Drilling and Completions Reported, 1973

Classification		1973				1972				% Change	
Gas	432	262	517	14	39	832				+ 65	+ 0
Oil										- 71	- 71
Oil & Gas	514	4	45							+ 15	+ 15
Dry										+ 20	+ 20
Total			995								
Gas	32	13	1							+146	+146
Oil	2									+100	+100
Dry		11								+120	+120
Total			45							+137	+137
Gas	464	275	518	14	44	851				+ 69	+ 0
Oil										- 71	- 71
Oil & Gas	516	4	56							+ 27	+ 27
Dry										+ 22	+ 22
Total			1040								
Gas	18	22	2							- 18	- 18
Oil & Gas	5									+150	+150
Dry		36								+ 38	+ 38
Total			59							+ 18	+ 18
Gas	482	297	518	16	70	901				+ 62	+ 0
Oil										- 44	- 44
Oil & Gas	516	9	92	1099						+ 31	+ 31
Dry										+ 22	+ 22
Total											
Service (Gas & Water Injection Wells)		43								- 22	- 22
Gas Storage		14*								- 46	- 46
Old Well Workovers		165								- 20	- 20
TOTAL ALL WELLS		1321								+ 11	+ 11

Table 5. Exploratory and Primary Development Reported, 1973*

Type Well	1973	1972	% Change
Gas	41	20	+105
Oil	3	3	0
Dry	55	43	+ 28
Total (% Successful)	99 (44%)	66 (35%)	+ 50
Gas	441	277	+ 59
Oil	513	515	0
Dry	37	27	+ 37
Oil & Gas	9	16	- 44
Total (% Successful)	1000 (96%)	835 (97%)	+ 20
Gas	482	297	+ 62
Oil	516	518	0
Dry	92	70	+ 31
Oil & Gas	9	16	- 44
Grand Total (% Successful)	1099 (92%)	901 (92%)	+ 22

* Above figures include old wells drilled deeper

Table 6. Footage Reported, 1973 and 1972*

No. of Wells	1973 Class	Footage		% Change	Average Ft. Per Well	
		1973	1972		1973	1972
99	Exploratory	431,206	275,145	+57	4,356	4,169
1000	Development	2,133,604	1,529,065	+40	2,134	1,831
43	Service & Strat.	69,189	76,746	-10	1,609	1,395
1142	SUB TOTAL	2,633,999	1,880,956	+40	2,306	1,968
14	Gas Storage	55,455	41,363	+34	3,961	1,591
1156	TOTAL	2,689,454	1,922,319	+40	2,327	1,958

* Above figures include old wells drilled deeper

The 1973 reported discoveries are listed in Table 7 and selected reported exploratory failures are listed in Table 8. The locations of all of the exploratory tests are shown in Figure 8. In Tioga County number 10 is the location of a proposed deep wildcat whose tools were lost at a shallow depth, and the rig was skidded and number 76 was drilled. Figure 9 is a graph of the annual rate of shallow activity in the Commonwealth from 1950 to 1973, while Figure 10 shows the annual rate of deep exploration and development from 1930 to 1973.

At the end of 1973 a total of 3,227 deep wells had been drilled since the beginning of exploration in the deeper horizons. Of the 3,227 deep wells, 1,727 were gas wells, 137 oil and gas wells, 1,140 dry holes, 217 gas storage wells, 4 for waste disposal, and 2 for testing drilling equipment.

Production and Reserves

As shown in Table 9, oil production declined and gas production increased during the year. The portion of gas stored increased 7 percent from that of 1972.

The 3,206,000 barrels of Pennsylvania Grade crude had a value of about \$18,863,858. The 76,000 barrels of Corning Grade crude oil was produced from the Medina sandstone (Lower Silurian) mostly in Crawford County. This oil had a value of about \$363,550. The increase in the price of all crudes during the latter part of the year should stimulate the search for new oil and the development of primary and tertiary recovery projects during 1974 if the price is not rolled back. Crude production during 1974 should equal that of 1973.

The Bradford District again produced more crude oil than the combined production of the other districts in the State (Table 10). Table 11 shows by counties the number of producing oil wells and the crude oil production for 1972.

Figure 11 shows the annual production of crude oil in Pennsylvania from 1859 to 1973 and in the Bradford District from 1871 to 1973. The monthly variation in crude oil price, production and well completions is plotted in Figure 12 for the years 1930 to 1973 for the Bradford District.

At the end of 1973, there were approximately 16,800 producing gas wells in the Commonwealth. The 78,514,000 Mcf of shallow and deep gas shown in Table 9 had a value of about \$32,975,880. Figure 13 shows the following for the years 1946 to the present: (1) the yearly production of natural gas, (2) the yearly consumption of natural gas, (3) the natural gas reserves, and (4) the amount of natural gas in storage. The deep gas production by field and pool is shown in Table 12.

Gas Storage Fields

There were 14 wells drilled for gas storage during the year. Of these 14 wells, 8 were deep wells, 4 shallow, and 2 deep gas storage wells drilled deeper. Several storage wells were worked over during the year. Storage well drilling activity was down 46 percent from that of 1972. Figure 8 of Progress Report 186 shows the distribution and lists the names of the current gas storage fields in Pennsylvania.

Storage capacity increased during the year to 783,450 MMcf compared to 763,183 MMcf in 1972. The total gas in storage on December 31, 1973 was 647,041 MMcf or 7 percent more than the amount stored on December 31, 1972. The gas in storage consisted of 32,965 MMcf of native gas and 614,076 MMcf of stored gas.

Secondary and Tertiary Recovery Projects

There were 43 water or gas injection wells completed during the year, down 22 percent from those completed in 1972. In McKean County 126 oil wells were completed, most of them in secondary recovery projects. The waterfloods in McKean County continue to produce the largest part of Pennsylvania's yearly crude oil production.

The two Marafloods continue to operate in Pennsylvania. The Warren County project in the First Venango sand is still in the experimental stage. The McKean County project in the Bradford Third sand continues into its fifth year. With the increase in the price of crude oil this project should now be economical. This type of flood should have wide acceptance in the Bradford field over the next few years as more of the experimental data are released and the materials used in the flood become less expensive.

Table 7. Reported Discoveries in Pennsylvania, 1973

Map No.	County	Operator Well No. & Lease	Compl. Date M-Day-Y	Total Depth (Ft.) at T.D.	Name of Formation or Zone	Prod. Depth (Ft.) or Zone	Prod. Formation	Initial Daily Prod.	Field or Pool Name	Explor. Class	Remarks
53	Cambria	Peoples Nat. Gas Co. 1 Luella M. Crawford	6/ 7/73	3,996	Canadaway Group	3,509	Canadaway Group	678 Mcf	Colver Pool	SPD	Shallow pool discovery in Pindleton field.
55		Peoples Nat. Gas Co. 2 Joseph Gabany	7/13/73	4,001	Canadaway Group	3,878	Canadaway Group	959 Mcf	South Fork Field	NFD	Shallow field discovery on Ebensburg anticline.
52		Peoples Nat. Gas Co. 1 George Lowmaster	6/18/73	4,006	Canadaway Group	3,117	Canadaway Group	696 Mcf	Benedict Pool	NPD	New pool discovery in Carrolltown field.
92	Cameron	Con. Gas Sup. Corp. 1 Emporium Water Co.	8/ 4/73	6,525	Helderberg	2,027	Canadaway Group	168 Mcf	Salt Run Pool	SPD	Shallow pool discovery in East Emporium field, Sabinsville anticline.
91		Linn, & Patrick Pet. 1 Pa. Tract 189	8/24/73	6,890	Helderberg	6,847	Oriskany	1,950 Mcf	Canoe Run Field	NFD	Discovery on south flank of Sabinsville anticline.
31	Clearfield	Con. Gas Sup. Corp. 1 Jas. Mitchell Est.	7/11/73	3,496	Canadaway Group	2,956	Canadaway Group	231 Mcf	Irish Run Pool	SPD	Shallow pool discovery in Punxsutawney-Driftwood field.
27		Mann, C. L. 1 U. C. & Mina Miles	12/16/72	3,412	Canadaway Group	3,346	Canadaway Group	400 Mcf	Troutville Pool	NPD	New pool discovery in Big Run field.
94		Texaco, Inc. 1 Gen. Refractories	3/30/73	8,032	Helderberg	8,005	Oriskany	2,196 Mcf	W. Decatur Field	NFD	Discovery on south flank of Laurel Hill anticline.
89	Elk	Fairman Drilling Co. 1 Sylvania (Pa. Game)	9/20/73	8,202	Salina	6,492	Bass Island	531 Mcf	Boot Jack Pool	DPD	Deeper pool discovery in the Horton field on the Hebron anticline.
90		Linn, E. H. et al 1 UNG-Stackpole	11/ 7/72	6,462	Helderberg	6,414	Helderberg	396 Mcf	Benzinger Field	NFD	Discovery on south flank of Harrison anticline.

100	Erie	Linn, E. H. et al 1 Joseph Orschek	9/17/72	6,055	Gatesburg	3,437	Medina Group	1,214 Mcf	Bull Reser. Field	NFD	Medina discovery in northwestern Pennsylvania.
62		Pennsylvania Gas Co. 1 Jos. R. McLaughlin	1/19/73	2,187	Oriskany	2,187	Oriskany	15,000 Mcf	McKean Field	NFD	Oriskany discovery in northwestern Pennsylvania.
37	Indiana	J & J Enterpr., Inc. 1 Dickey Lumber Co.	11/ 8/72	3,357	Canadaway Group	3,206	Canadaway Group	1,186 Mcf	Lockvale Pool	NPD	New pool discovery in Big Run field.
39		J & J Enterpr., Inc. 1 A. Tate	3/21/73	3,759	Canadaway Group	3,678	Canadaway Group	1,644 Mcf	Arcadia Pool	NPD	New pool discovery in East Run field on south flank of Chestnut Ridge anticline.
42		Peoples Nat. Gas Co. 1 Vernon Kirkland	11/25/72	3,816	Canadaway Group	3,367	Canadaway Group	381 Mcf	Tanoma Pool	NPD	New pool discovery in Rintersburg field.
43		Peoples Nat. Gas Co. 1 Muzzer Forests	11/14/73	3,416	Canadaway Group	3,228	Canadaway Group	381 Mcf	Onberg Pool	NPD	New pool discovery in Indiana field.
51		T. W. Phillips G & O 1 William W. Platt	6/ 9/73	3,751	Canadaway Group	3,670	Canadaway Group	952 Mcf	Smith Pool	NPD	New pool discovery in Blairsville field.
7	McKean	Porterfield Petro. 1 Pa. Gas Tract 5570	6/11/73	2,001	Canadaway Group	1,646	Canadaway Group	500 Mcf	Whiting Run Pool	NPD	New pool discovery in White Gravel field.
13	Venango	Cinco Oil Co. G-1 Johnson & Reed	2/21/73	2,014	Canadaway Group	1,816	Canadaway Group	50 Mcf	Allender Run Pool	DPD	Deeper pool discovery in Pithole-Cashup field.
82		Peoples Nat. Gas Co. 1 William F. Duncan	4/ 5/73	6,720	Queenston	6,593	Medina Group	5,600 Mcf	Duncan Pool	DPD	Deeper pool discovery in Barkeyville field.
81		Peoples Nat. Gas Co. 1 Tasa Corporation	12/ 1/72	6,510	Queenston	6,414	Medina Group	2,740 Mcf	Irwin Pool	DPD	Deeper pool discovery in Westley field.
57	Westmoreland	Lechner Gas & Oil 2 Rhodes, R & H	11/17/72	1,960	Big Injun	1,760	Big Injun	200 Mcf	Turkeytown Pool	SPD	Shallow pool discovery in West Newton field.
58		Peoples Nat. Gas Co. 1 Donald G. Leeper	8/23/73	4,000	Canadaway Group	2,620	Fifty Foot	1,205 Mcf	Sheppler Hill Pool	DPD	Deeper pool discovery in Webster field.

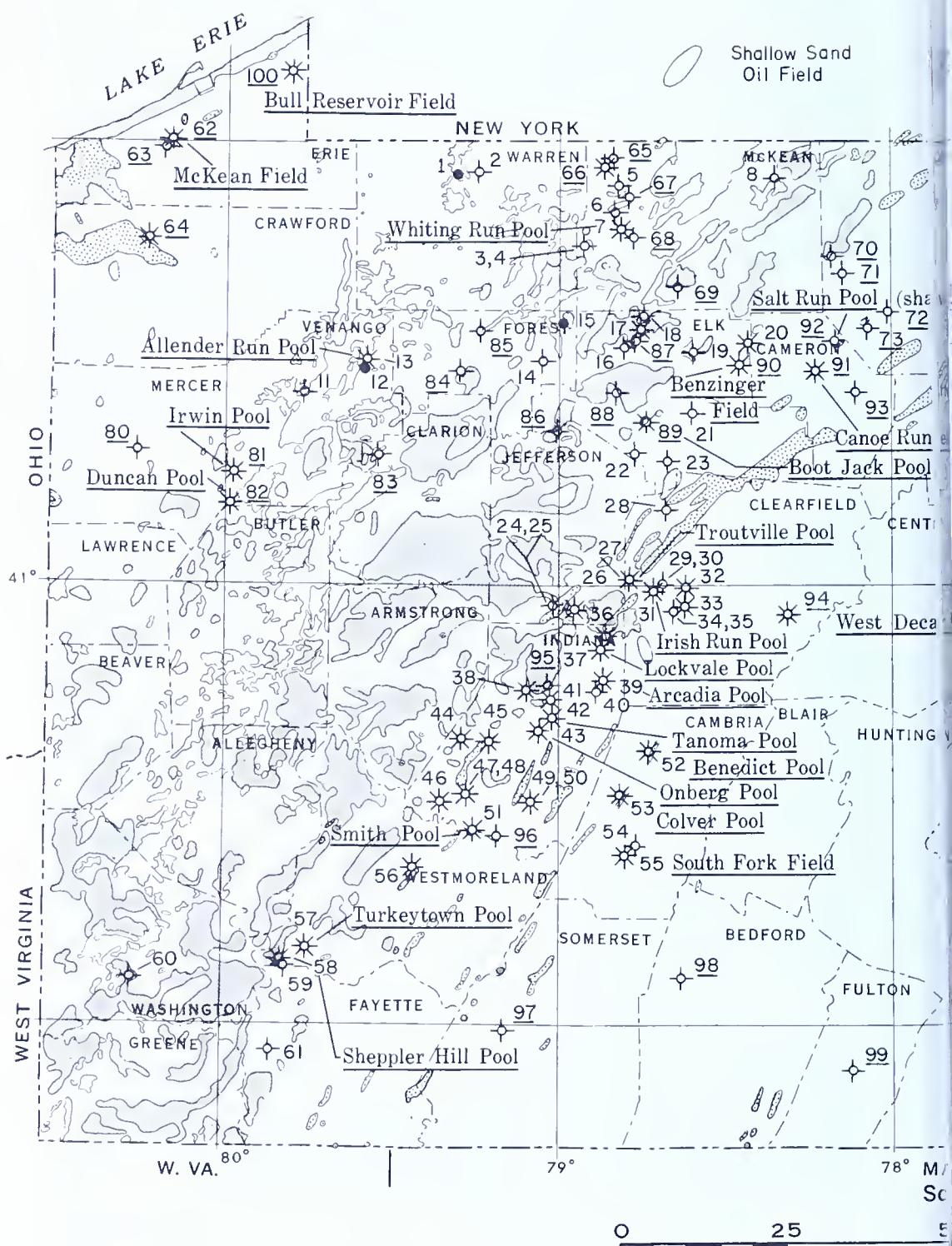
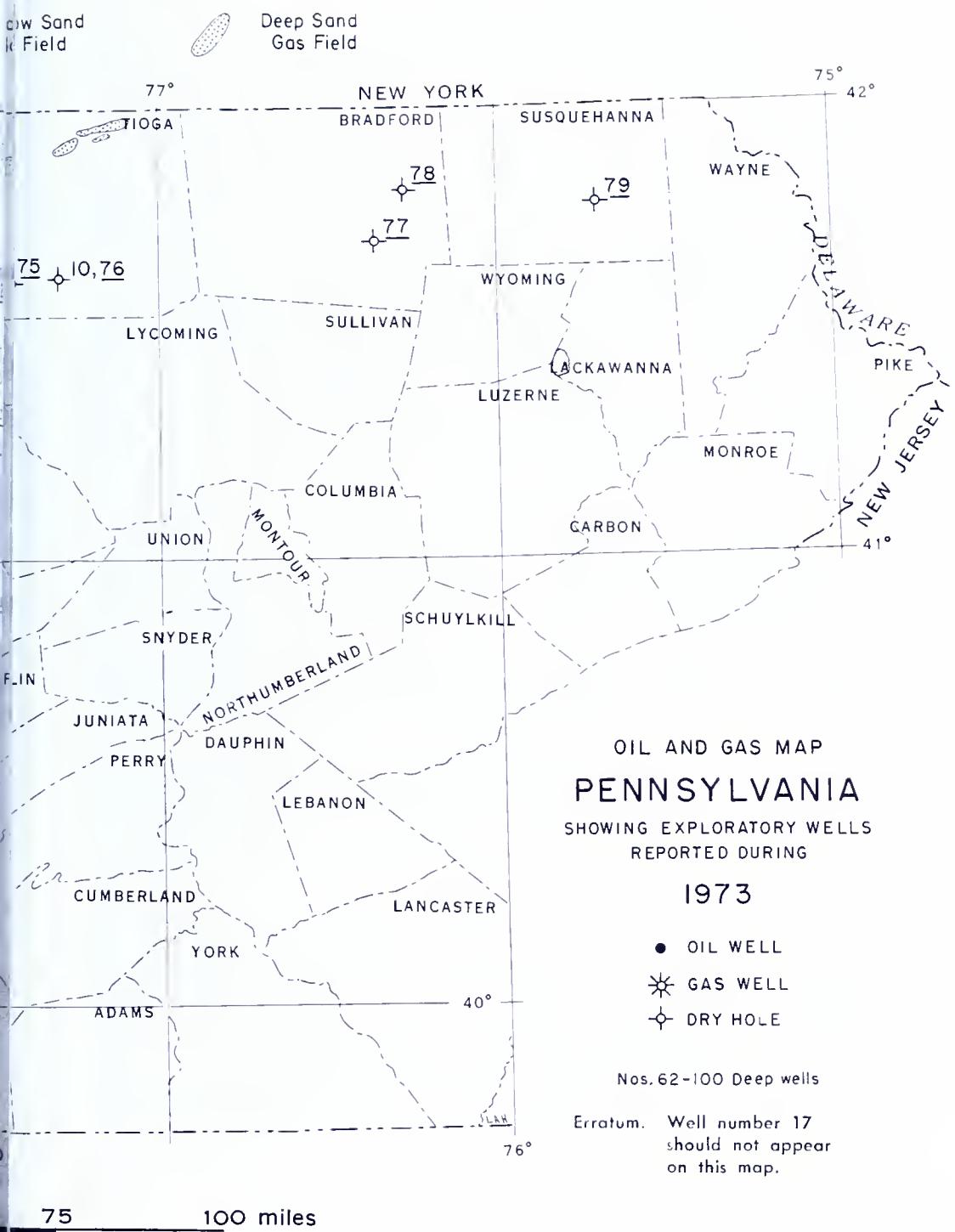


Figure 8. Oil and gas map of
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nia showing exploratory wells
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Table 8. Selected Exploratory Failures Reported in Pennsylvania, 1973

Map No.	County	Operator Well No. & Lease	Compl. Date M-Day-Y	Total Depth (Ft.)	Name of Formation at T.D.	Explor. Class or Field	Remarks
98	Bedford	Texas Eastern Trans. Corp. 1 Rule S. Taylor, et al	7/11/72	11,597	Beekmantown Dolomite	NFW	Drilled on Schellsburg dome.
78	Bradford	Shell Oil Company 1 Henry Comiskey Unit	7/ 7/73	7,830	Silurian Salt	NFW	Drilled on north flank of Towanda anticline.
77		Shell Oil Company 1 Ralph Kissell Unit	9/ 1/73	7,507	Oriskany	NFW	Tested Oriskany south of the Towanda anticline.
93	Cameron	Consolidated Gas Sup. Corp. Wn-1300 Pa. Tract 211	9/27/73	6,525	Helderberg	NFW	Tested Oriskany on Marshlands anticline.
83	Clarion	Earl H. Linn, et al 1 W. B. Dunn—UNG Co.	3/11/73	6,452	Lockport	DPW	Rank Lockport wildcat.
21	Elk	Lenhart & Bennett, Inc. 1 Cochran-Bates	5/22/73	3,025	Canadaway	NFW	Rank wildcat tested Upper Devonian sands.
17		Lenhart & Bennett, Inc. 1-4279 Dan Forth	5/ 4/73	3,025	Canadaway	NFW	Rank Upper Devonian wildcat.
88		Earl H. Linn, et al 1 Pennsylvania Gas-ANF	2/20/73	6,055	Silurian Salt	DPW	Tested Upper Silurian in Bear Creek field.
87		Earl H. Linn 1 UNG-ANF	11/26/72	6,310	Silurian Salt	DPW	Tested Upper Silurian on Smethport anticline.
61	Fayette	Peoples Natural Gas Co. 1 C. M. Gray, Jr.	9/10/73	4,513	Canadaway	NPW	New pool wildcat in Antrim field.
84	Forest	Earl H. Linn 1 Collins-Clinger	5/11/73	6,855	Queenston	DPW	Medina test along Oriskany pinchout.
99	Fulton	Consolidated Gas Sup. Corp. 1 Kermit Mellott James Drilling Corp. Agent	11/30/72	3,572	Helderberg	NFW	Oriskany absent. Oriskany test in highly folded Valley and Ridge province.
96	Indiana	1 Oaks Point Realty Co. Peoples Natural Gas Co. 3 Alta Wissinger	1/ 7/73	7,695	Helderberg	DPW	Oriskany test on Chestnut Ridge anticline.
95		Earl H. Linn, et al 1 Mars Co. UNG Co.	5/ 6/73	7,735	Helderberg	DPW	Oriskany test on western flank of Richmond anticline.
86	Jefferson	6/25/73	7,711	Queenston	DPW	Oriskany test on Smethport anticline, Oriskany absent.	

67	McKean	Federal Oil and Gas Co.	11/24/73	4,385	Oriskany	DPW	Oriskany test in area of gas shows from Oriskany.
65		1 Onofrio	10/ 8/73	4,097	Helderberg	EXT	Defined northeastern extension of Oriskany Corydon field.
		Felmont Oil Corp.					Upper Silurian test at south end of Bradford anticline.
68		4 Kewanee Oil Co.	2/ 2/73	5,450	Lockport	DPW	
		Earl H. Linn, et al					
69		1 Pa. Gas-Texas Gulf Sulphur					
		Earl H. Linn, et al	12/21/72	6,787	Lockport	DPW	Upper Silurian test on Smethport anticline, Oriskany absent.
80	Mercer	1 UNG-Manor Real Est.	10/17/72	5,660	Queenston	NFW	Test through Silurian in rank wildcat area.
		The Mars Company					
72	Potter	X-167 David J. Croskey					
		Columbia Gas Trans.	12/ 5/72	6,843	Bass Island	NFW	Oriskany test on Sabinsville anticline, Oriskany absent.
		Corp.					
71		2 North Penn					
		Columbia Gas Trans.	11/18/72	6,144	Bass Island	NFW	Oriskany test on Harrison anticline, Oriskany absent.
		Corp.					
74		1 North Penn Gas Corp.					
		Columbia Gas Trans.	1/11/73	6,733	Bass Island	EXT	Test of Oriskany northeast of Ole Bull Oriskany gas pool.
		Corp.					
70		1 Pa. Tract 174					
		Earl H. Linn	1/ 9/73	6,160	Helderberg	NFW	Oriskany test on south flank of Hebron anticline, Oriskany absent.
		1 Hammermill Paper Co.					
73		Lee E. Mintner	9/16/73	6,977	Helderberg	NFW	Oriskany present, shifting "no sand line" to the northwest.
		2 North Penn Gas					
97	Somerset	Amoco Production Co.	6/29/73	9,800	Oriskany	NFW	Test on northern end of Centerville dome, Oriskany faulted.
		I. E. H. Weimer					
79	Susquehanna	Shell Oil Company	10/ 7/73	8,534	Silurian	NFW	Upper Silurian test in rank wildcat area of northeastern Pennsylvania.
		1 H. Wesley Pease Unit					
76	Tioga	Amoco Production Co.	1/ 3/73	10,300	Salt	NFW	Silurian test in rank wildcat area.
		I-A S. & S. Coal Co.					
75		Consolidated Gas Sup.	8/24/73	7,315	Queenston	NFW	
		Corp.					
		Wn-1282, Pa. Tract 195					
2	Warren	Floyd A. Gearhart	11/11/72	827	Glade	NFW	Glade test east of main producing area.
		1 Emerson Spicer					

OIL AND GAS DEVELOPMENTS IN 1973

Table 9. Production and Reserves in Pennsylvania, 1973

	Production				Reserves		
	1973	1972	% Change to 12/31/73	Cumulative to 12/31/73	1973	1972	% Change
Penna. Grade Oil (1,000 bbls.)	3,206	3,363	-5	1,279,584	38,837	36,743	+ 6
Corning Grade	76	78	-3	426	776	602	+30
TOTAL OIL	3,282	3,441	-5	1,280,010	39,613	37,345	+ 6
Natural Gas Liquids (1,000 bbls.)	76	82	-7	—	659	735	-10
Gas (MMcf)	66,713	61,838	+7	—	—	—	—
Shallow	11,801	12,120	-3	—	—	—	—
Deep							
TOTAL GAS	78,514	73,958	+6	8,756,079	1,494,381*	1,406,948*	+ 6
Stored Gas					647,041	606,941	+ 7
* Stored Gas Included							

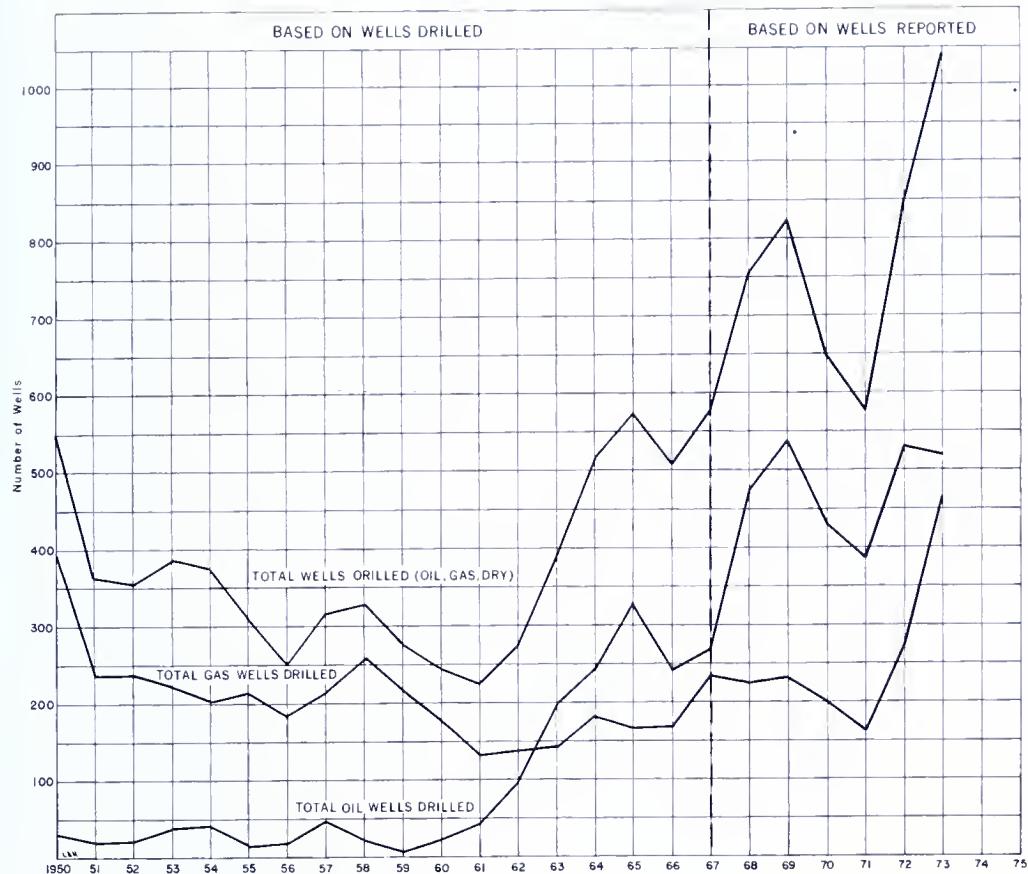


Figure 9. Shallow well activity, 1950-1973.

Table 10. Average Daily Oil Production

District	1973	1972	% Change
Bradford Field (Penna. portion only)	5,146	4,912	+ 5
Middle and Southwestern	3,638	4,288	-15
Medina Corning	208	214	- 3
TOTAL	8,992	9,414	- 5

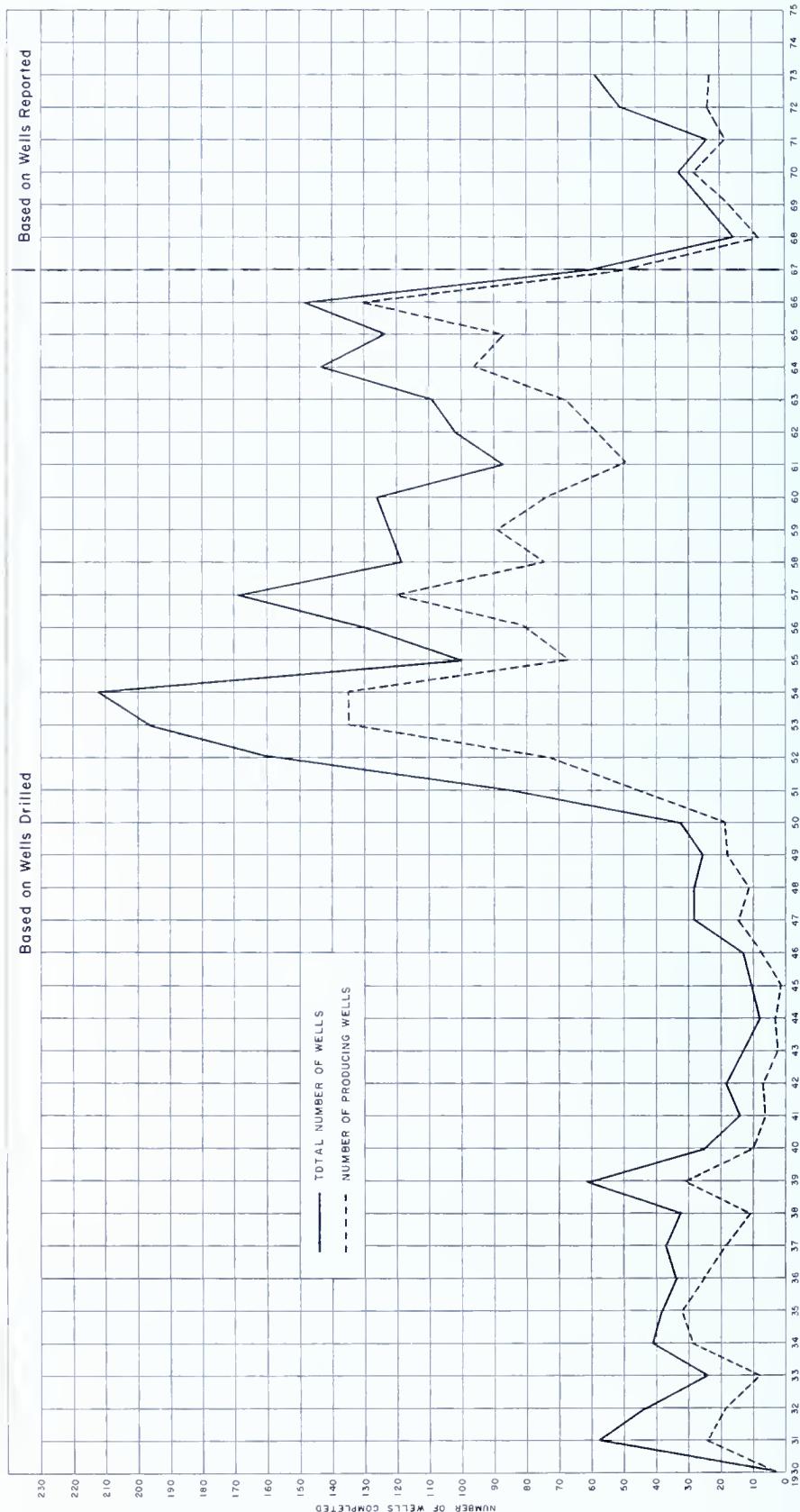


Figure 10. Annual rate of deep sand exploration and development, 1930-1973.

Table 11. Oil Wells and Crude Oil in Pennsylvania by Counties, 1972*

County	1972 Crude oil production (bbls.)	Number of producing oil wells as of 12/31/72
Allegheny	68,069	231
Armstrong	8,793	76
Beaver	5,643	60
Butler	85,726	1,414
Clarion	21,124	522
Crawford	83,499	458
Elk	25,646	77
Fayette	111	2
Forest	97,619	856
Greene	32,803	277
Jefferson	1,370	131
McKean	1,785,975	13,711
Mercer	970	93
Potter	12,025	189
Venango	551,358	9,501
Warren	548,245	4,453
Washington	112,024	545
Total	3,441,000	32,596

* Compiled by the Department of Commerce, Bureau of Statistics

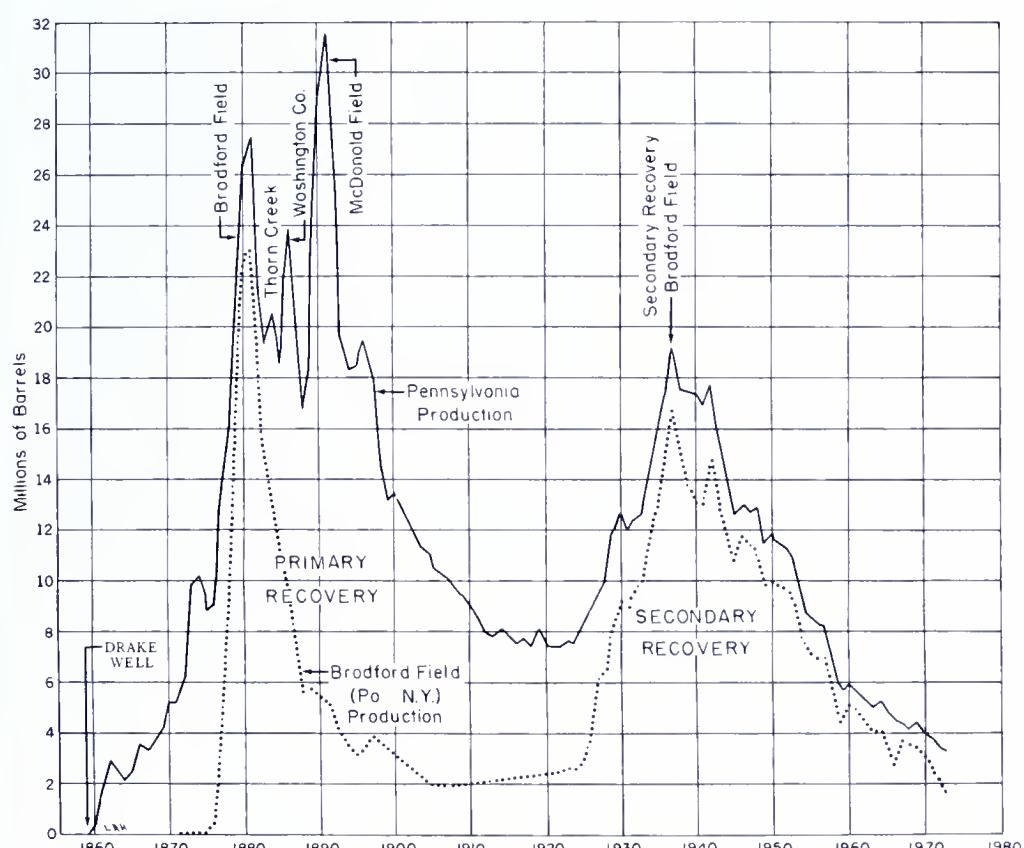


Figure 11. Annual production of crude oil in Pennsylvania.

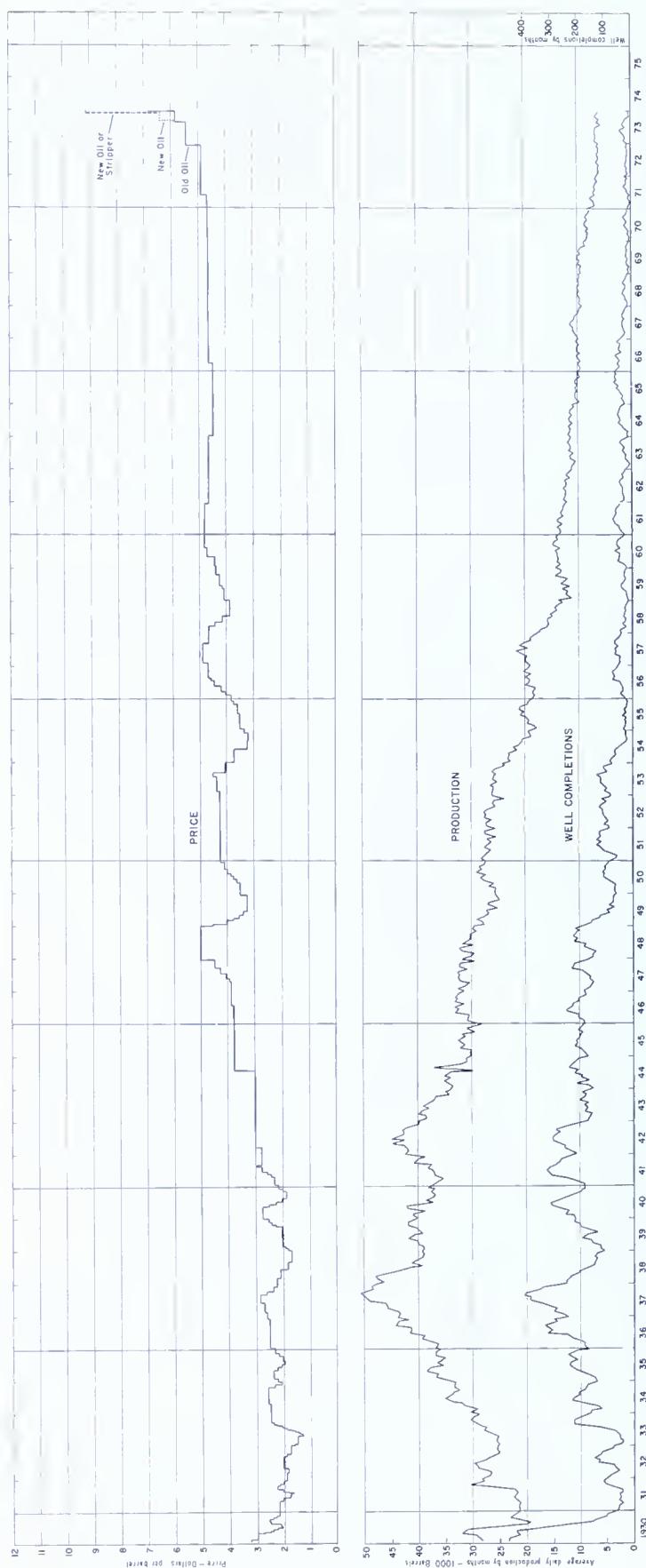


Figure 12. Crude oil prices, production and completions, Bradford District.

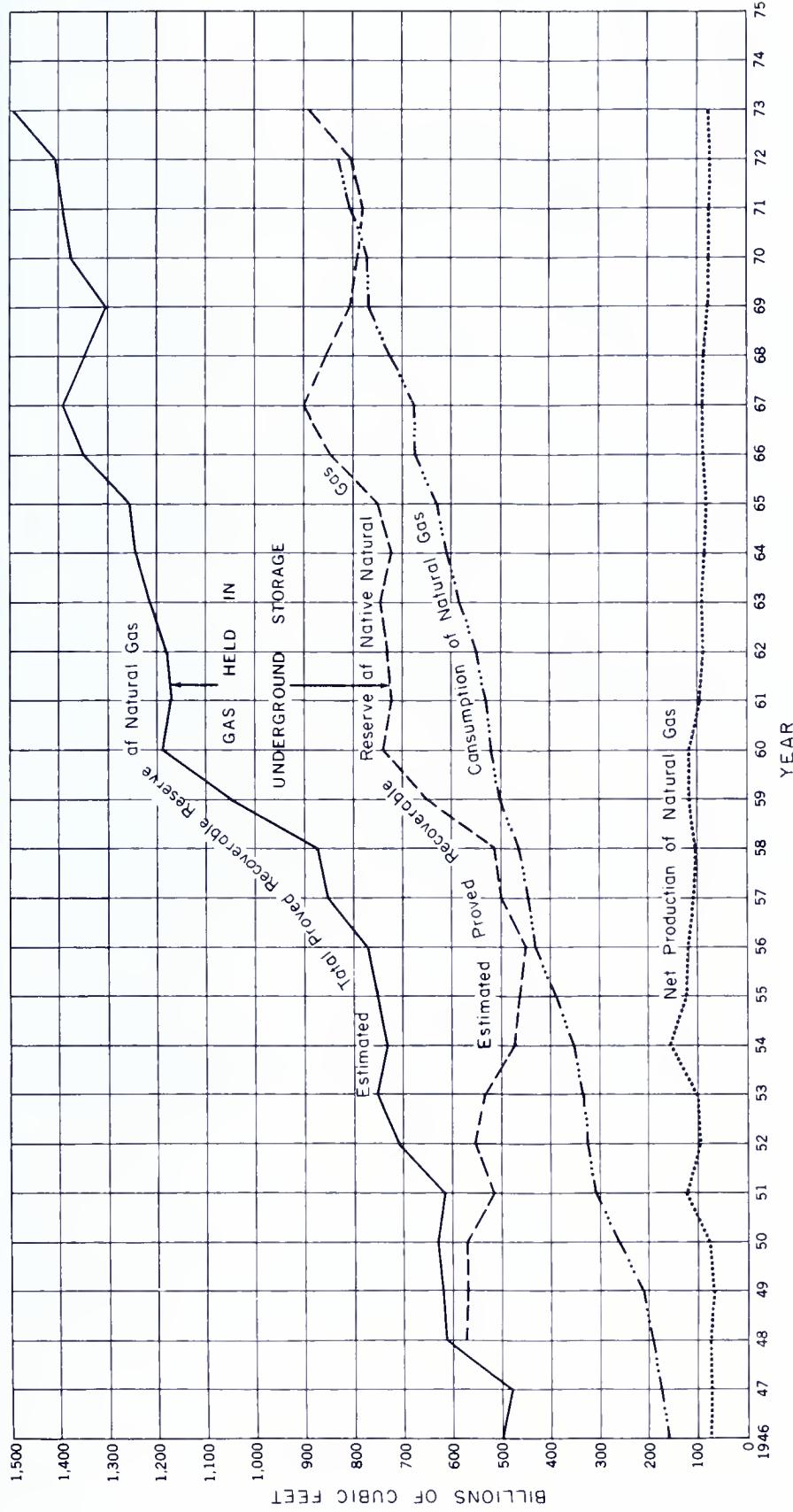


Figure 13. Production, consumption and reserves of natural gas in Pennsylvania.

Table 12. Deep Gas Production in Pennsylvania, 1973

Clinton & Potter Leidy	<i>TOTAL</i>	1/ 9/50	160,106,047	49,605	160,155,652	Gas storage and producing
Ole Bull		1/ 9/59	5,306,015	49,605	5,355,620	Producing
Crawford & Erie Connaut	<i>TOTAL</i>	2/11/57	30,183,524	1,923,726	32,107,250	Producing and abandoned
Bushnell- Lexington		12/31/58	13,803,456	530,968	14,334,424	Producing
Indian Springs		9/11/57	11,004,640	1,075,538	12,080,178	Producing
Kastle		7/14/62	2,709,915	158,126	2,868,041	Producing
Lundys Lane		11/ 9/61	1,565,844	126,985	1,692,829	Producing
Pierce		12/31/58	723,938	32,109	756,047	Producing
Elk Benzingier Horton	Boot Jack	11/ 7/52 9/20/73			Shut-in	Shut-in
Erie Bull Reservoir Burgess Corry		9/17/72 10/17/60 4/29/47	145,841 1,048,578 194,878	4,600 5,252 5,252	150,441 1,053,830 200,130	Shut-in Producing Gas storage and producing
McKean Meade		5/20/53 1/19/73 8/23/46	4,923,383	63,274 687	63,274 4,924,070	Producing Oriskany gas storage [1 producing Medina well]
Fayette Ohiopyle Sandy Creek*		12/28/59 8/ 8/63 8/ 8/63 6/31/69 10/31/61 3/24/38 3/24/38 5/ 9/42	3,908,197 541,531 393,788 147,743 2,528,655 42,604,125 21,054,642 21,522,333	90,102 34,675 18,274 16,401 698,964 153,141 68,441 84,700	3,998,299 576,206 412,062 164,144 3,227,619 42,757,266 21,123,083 21,607,033	Producing Producing Producing Producing Producing Producing Producing Producing
Spruell Summit						
Indiana Cherry Hill *	Crichton Hadden	1/ 9/63 7/11/63 9/21/56	2,766,681 28,131,131	46,847 282,923	2,813,528 28,414,054	Producing Producing
Jacksonville Nolo Strongstown		9/30/56 12/20/69	13,278,391	67,169	13,345,560	Producing Shut-in 1971
Jefferson Big Run *	Elk Run	6/30/65 9/ 8/72	44,198,000 **	1,090,900	45,288,000	Producing Shut-in
McKean Corydon						

Table 12. (Continued)

County	Field	Pool	Discovery Date	Cumulative Production at End of 1972 (In Mcf)	Production 1973 (In Mcf)	Cumulative Production at End of 1973 (In Mcf)	Status of Field or Pool at End of 1973
Mercer	Henderson	Kilgore	10/26/66	153,149	17,977	171,126	Producing
	Wheatland		7/24/63				Production not available
Potter	Ulysses	New Field	10/ 2/39 4/ 2/62 {	3,670,857	112,261	3,783,118	Producing
Somerset	Boswell	TOTAL	11/11/58	10,714,864	143,881	10,858,745	Producing
		Boswell	11/11/58	9,802,612	120,999	9,923,611	Producing
		Snyder	6/16/60	912,252	22,882	935,134	Producing
Venango	Barkeyville	Duncan	4/ 5/73				Shut-in
		Irwin	12/ 1/72				Shut-in
Warren	Sugar Grove	Pettigrew	5/29/70				Production not available
Washington	Daniels Run*	Glyde	9/ 6/61	92,211	10,615	102,826	Producing
Westmoreland	Blairsville*	Kahl	10/23/62	8,947,760	306,782	9,254,542	Producing
	Latrobe*	Dry Ridge	8/25/46	5,042,852	125,004	5,167,856	Producing
	Jacobs Creek*	Bailey	12/26/61	1,405,143	120,104	1,525,247	Producing
	Lycippus	TOTAL	8/17/49	6,136,277	78,900	6,215,177	Producing and abandoned
Murrysville*	St. Boniface						
	Chapel	9/13/56	5,396,849	78,900	5,475,749	Producing	
	TOTAL	11/ 3/1878	518,241	53,714	571,955	Producing	
	Duquesne	8/ 8/65	389,314	53,714	443,028	Producing	
	Sloan	10/22/63	128,927				Abandoned
Westmoreland & Somerset	Johnstown						
	TOTAL	5/16/57	23,853,632	1,267,186	25,120,818	Producing and abandoned	
	Baldwin	5/22/60					
	Beck	5/16/57	8,295,917	506,104	8,802,021	Producing and abandoned	
	Williams	2/14/58	15,557,715	761,082	16,318,797	Producing	
	TOTAL	12/15/58	6,963,590**	151,799	7,115,389	Producing and abandoned	
	Blair	12/ 5/58	5,693,112**	125,635	5,818,747	Producing	
	Tunnel	3/10/65	558,055	26,164	584,219	Producing	
	Seven Springs	8/ 3/66					

* "Shallow" gas production of field not shown

** Correction

Oil and Gas Prices

Crude oil prices for the year are shown in Table 13. The average well-head price paid for intrastate natural gas during the year was about 46 cents per Mcf. The average price for interstate natural gas ranged from 32 to 45 cents per Mcf. The trend is to increase the price of gas which must be done if an increase in the exploratory effort is to take place. New higher gas prices are about to be announced by the public utility companies.

Table 13. Crude Oil Prices per Barrell, Pennsylvania, 1973

	Pennsylvania Grade Crude					
	All Oil**		New Oil	New Oil or Stripper***		
	1/1/73	8/20/73	9/1/73	12/1/73	11/1/73	12/1/73
Bradford District	\$5.48	\$5.83	\$6.47	\$7.47		\$9.17
Middle District	5.20	5.55	6.10	7.10		8.80
Southwest District	4.77	5.12	5.95	6.95		8.65
			Corning Grade Crude			
Crawford and Erie Counties	\$3.82	\$4.17	\$5.17	\$6.17	\$8.52*	\$10.00

* New oil \$8.52 effective 11/1/73; Stripper \$8.52 effective 11/16/73.

** Old oil was increased \$1.00 a barrel in all districts on 12/19/73 from what is shown under 8/20/73 above.

*** Stripper well is one that produces 10 barrels or less per day.

Land Sales

At the end of 1973, the Pennsylvania Game Commission had 37 active leases totaling 22,796 acres; there were 48 wells producing on 30 of the above leases and 1 dry hole drilled. A total of 13,744 acres of Commission land was leased during the year.

In 1973 ten tracts of State Forest or Park lands were leased for the exploration and development of oil and gas. From the leasing of these tracts which are located in Elk, Cameron, Potter and Somerset Counties, the Department will receive a first-year rental bonus of \$215,326 for 17,600 acres. The average bonus per acre received from the competitively bid tracts was \$12.41.

Rent and royalty payments relative to oil and gas exploration and development from State Forest and Park lands resulted in a total income of \$617,414.

Royalty payments for the year amounted to \$123,032 for 2,083 MMcf of gas produced from State lands, while rental payments totaled \$494,382 for tract rentals, gas storage, pipeline rights of way, compressor and pumping stations and seismic surveys.

On October 1, 1973 the Department put under lease 1,732 acres of land in the Buchanan State Forest, Mann and Southampton Townships, Bedford County, for the Five Forks gas storage field.

At the end of the year, 249,408 acres of State Forest and Parks lands were under lease for oil and gas exploration and development. This figure includes 60,841 acres in gas storage.

Geophysical Activity

The Department of Environmental Resources issued eight Seismic Permits to industry to conduct subsurface studies to evaluate our lands for possible oil and gas exploration. These permits were located in Bedford, Centre, Clearfield, Clinton, Fayette, Lycoming, Potter and Tioga Counties.

Seismic activity was down from the 263 crew-weeks during 1972 to 161 crew-weeks in 1973 with most of the activity being Vibroseis. The total cost of this seismic work was about \$2,400,000. The seismic surveys were made in Allegheny, Bedford, Bradford, Blair, Butler, Cambria, Cameron, Centre, Clarion, Clearfield, Clinton, Elk, Fayette, Jefferson, Lackawanna, Lycoming, McKean, Pike, Potter, Somerset, Sullivan, Venango, Washington, Wayne, Westmoreland, and Wyoming Counties, 26 of the 67 counties in the Commonwealth.

1973 Highlights

There were more discoveries in Pennsylvania during 1973 than in any other year since 1950, when the first of this series of development reports was published. All of the 23 discoveries in 1973 were gas.

Of the 23 discoveries, the McKean field discovery well in Erie County had the highest initial open flow of all the discoveries during the year with 15,000 Mcf of gas per day from the Oriskany (Lower Devonian) sandstone. The West Decatur field, whose discovery well in Clearfield County had an open flow of 2,196 Mcfgpd, could develop into a sizable Oriskany field. The two Medina (Lower Silurian) gas discoveries in southwestern Venango County have opened an area to possible Medina production from Lake Erie to a line running from the northwest corner of Beaver County to the northeast corner of Warren County. Since the discoveries, a large part of this area has been leased.

The Grampian shallow gas field discovered in 1972 had 4 development and 4 outpost wells drilled in the field during 1973.

Two other wells were significant. The #1 UNG Stackpole well in Elk County found gas in the Helderberg (Lower Devonian), discovering the Benzinger field. This is the first well in the State to produce gas solely from the Helderberg. Another Elk County well, the #1 Pennsylvania Game Commission, found gas in the Bass Island (Lower Devonian), discovering the Boot Jack pool in the Horton field. This is the first gas well in the State producing only from the Bass Island.

At the end of 1973 two Cambrian tests were being drilled. The #1 Dewey in Gaines Township, Tioga County, is a 15,300-foot test. In Middle Creek Township, Somerset County #1 L. Svetz is a 20,500-foot test.

INDUSTRY RELATED ACTIVITIES

Subsurface Base Maps

Twenty-one base maps (Figure 14) showing locations of oil and gas wells and the outlines of the oil and gas fields are now available. Each base map encompasses four 15-minute topographic quadrangles and is at the same scale (1 inch equals 1 mile). A five-minute grid, quadrangle names, county boundaries, and major rivers and towns make up the background of the base map. All deep wells known and all shallow wells on record with the Pennsylvania Geological Survey are located, and the status (dry, oil producing, gas producing, etc.) is shown by symbol. Deep wells (Tully Formation or deeper) are differentiated and elevation and total depth are shown. Symbols indicate the availability of geophysical log and sample data on open file in the Survey's Oil and Gas Division office in Pittsburgh. An index map with the legend shows the outlines of oil and gas fields within the mapped area, thus indicating areas of extensive pre-1956 drilling. A listing of the field names is also included.

Paper prints of the base maps can be obtained by writing to the State Book Store, P. O. Box 1365, Harrisburg, Pennsylvania 17125. The cost of each base map is \$0.50, plus a 6 percent sales tax to Pennsylvania residents. A check for the appropriate total amount made out to the Commonwealth of Pennsylvania must accompany the order. When ordering please specify the map number.

A cross index of state permit numbers with quadrangle map numbers used on the base maps is available from the Pittsburgh Branch of the Pennsylvania Geological Survey, 1201 Kossman Building, Stanwix Street, Pittsburgh, Pennsylvania 15222. This index is arranged by quadrangles. Please specify the quadrangle when requesting this literature. Base maps

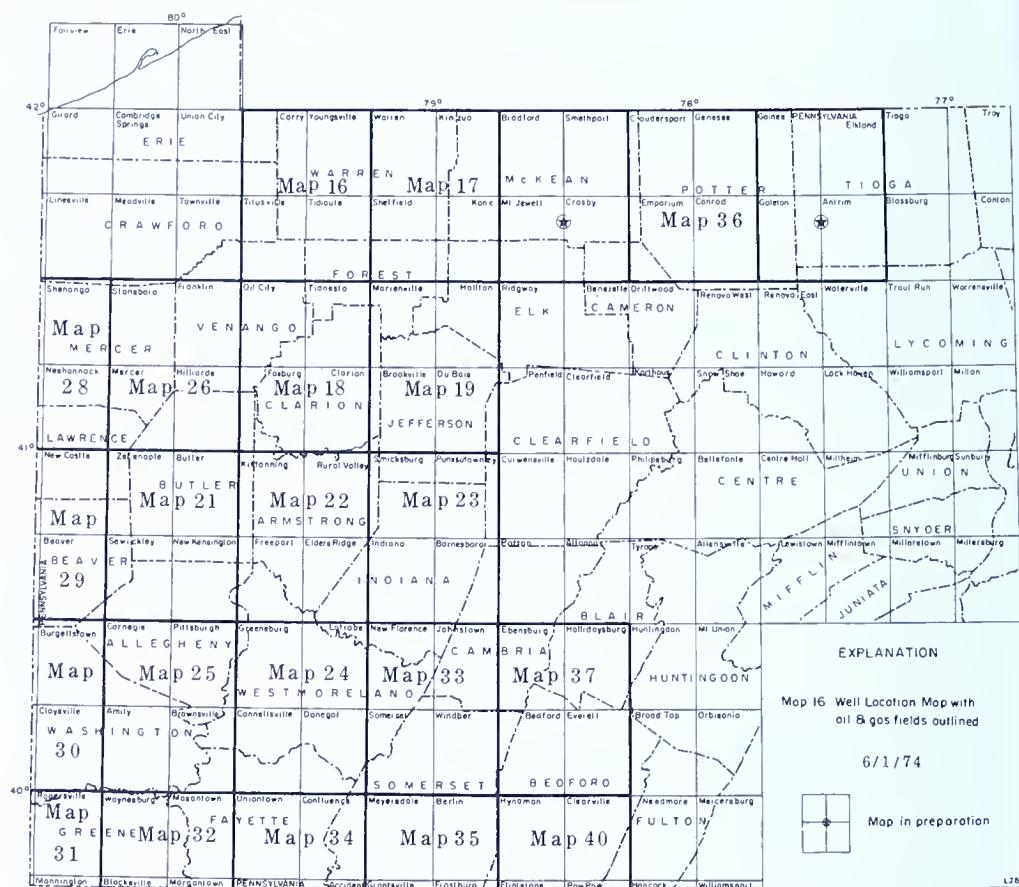


Figure 14. Index of available subsurface base maps.

are updated every six months. Maps now available were updated as of June 1, 1974.

Open-File Reports

The following reports are on open file (OF) and may be examined at the Oil and Gas Division office of the Bureau of Topographic and Geologic Survey in Pittsburgh. Copies of these reports may be purchased for the cost of duplication.

- OF 1. *Surface to Middle Devonian (Onondaga) Subsurface Stratigraphy, Part 1.*

OF 2. *Principal natural gas pipelines of Pennsylvania. Principal crude oil and product pipelines of Pennsylvania, 1:500,000 maps.*

- OF 3. *Deep sand exploration and gas developments in Pennsylvania, 1:250,000 map in 6 parts.*
- OF 4. *Salina or equivalent and deeper penetrations of Pennsylvania, 1:500,000 map.*
- OF 5. *Tully and deeper formations, brine analyses of Pennsylvania, chart and 1:500,000 map.*
- OF 6. *Stratigraphic framework of the Greater Pittsburgh area, Parts 1 and 2.*
- OF 8. *Structure, geologic, and Pittsburgh coal overburden maps of the Greater Pittsburgh area, 1:24,000 map.*

PART III. SUMMARIZED RECORDS OF DEEP WELLS

REPORTED IN 1973

The information in the following tables has been compiled mainly from drillers' logs and location plats received from the Oil and Gas Division of the Bureau of Land Protection and Reclamation. Other sources are Petroleum Information Corporation (PI), geophysical logs received by the Pennsylvania Geological Survey, and personal communications with oil and gas operators. The identification numbers in Table 14 refer only to well location numbers on Figure 8 of this report. The more significant numbers are the permit numbers by which the wells are filed with the Bureau of Land Protection and Reclamation and the unique quadrangle numbers by which the Survey files the wells and locates them on 15-minute quadrangle maps.

A single asterisk appearing on a log indicates that all formation tops and total depths were picked from a geophysical log. A log without an asterisk means that the formation tops and total depths are from the driller's log or PI. Where a double asterisk appears, the 7½-minute quadrangle name and location are given. A plus sign appearing on a log indicates that all formation tops and total depths were picked from sample descriptions. These tables are listed alphabetically by county and by name of well. The elevations are either Kelly bushing (KB) or ground (GR).

The producing depth record and the drilling depth record still stand at 11,458 feet in the Tuscarora (Lower Silurian) sandstone and 18,834 feet in the Upper Cambrian, respectively.

Table 14. Summarized Record of Deep Wells Reported in 1973

SUMMARIZED RECORDS

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MAP NUMBER	COUNTY	Permit Number	Bedford	Bradford	Bradford	Bradford	Cameron	Cameron	Cameron	Cameron	Cameron	Cameron	Clarion
NAME OF WELL	Roy C. Shipley #2	Roy S. Taylor, et.al. #1	Henry Cominsky #1	Ralph Kissel Unit #1	Emporium Water Co. Wm-189	Emporium Water Co. Wm-183	Pa. Tract 189, Wh-1283	Pa. Tract 168, Wh-1284	Pa. Tract 211, Wh-1300	Dunn-JUNG #1 - 284			
OPERATOR	Columbia Gas Trans. Corp.	Texas Eastern Trans. Corp.	Shell Oil Co.	Shell Oil Co.	Consol. Gas Supply Corp.	Consol. Gas Supply Corp.	Earl Linn, et.al	Consol. Gas Supply Corp.	Consol. Gas Supply Corp.	Earl H. Linn Patrick Petroleum			
TOWNSHIP	Mann	Hapier	Herrick	Asylum	Portage	Lumber	Shippen	Portage	Lumber	Ashland			
QUADRANGLE	Clearville G 41	Bedford E 4	Towanda I 6	Monroeton B 3	Emporium H 30	Emporium G 36	Driftwood A 121	Emporium H 35	Driftwood 8 120	Oil City 1 2			
LATITUDE	9,000 ft.; S 39°50'	23,600 ft.; S 40°10'	7,300 ft.; S 41°50'	18,550 ft.; S 41°45'	11,500 ft.; S 41°35'	19,400 ft.; S 41°35'	8,050 ft.; S 41°30'	10,350 ft.; S 41°35'	24,800 ft.; S 41°30'	1,300 ft. 5 41°20'			
LONGITUDE	2,500 ft.; W 78°25'	12,650 ft.; W 78°35'	2,700 ft.; W 76°15'	2,400 ft.; W 76°20'	22,600 ft.; W 76°05'	5,000 ft.; W 78°10'	17,600 ft.; W 78°05'	14,850 ft.; W 78°05'	6,000 ft.; W 78°05'	10,000 ft. W 79°30'			
DATE COMPLETED	7-15-73	7-11-72	7-7-73	9-1-73	8-4-73	6-30-73	8-24-73	7-24-73	7-24-73	9-27-73	3-14-73		
ELEVATION	1349 ft	1652 ft	1294 ft	1369 ft	1922 ft	1970 ft	1734 ft	2105 ft	2108 ft	1638 ft			
TULLY			*4694-4804	4892-	*5813-5872	*5392-	*6200-6270	*6045-	*5740-	*4882-4970			
ONONDAGA LIMESTONE	*5490-5590		6557-6610	6940-7108	6434-6453	6624-	6806-6828	6653-	6427-	5190-			
ORISKANY	5590-Gas 5703		6830-6939	7400-7507	6463-6473	6641-6678 5.W. 6671	6628-6848 Gas	6671-6706 556	6445-6897	Absent			
HELDERBERG			70-	6939-7330		6678-	6848-	6706-	6497-	5240-			
KEISER-BASS ISLAND SALINA													
GUELPH - LOCKPORT BLACK WATER			1405-Mckenzie										
CLINTON			1760-Keefer 1820-Rose Hill										
MEDINA			Tuscarora 240-380-	D									
QUEENSTON			Junita 275-4110-	D									
TOTAL DEPTH	5730	11,597	7830	7507	6525	6706	6865	6736	6735	6452			
OEEPEST FORMATION REACH	Oriskany	Gatesburg	Salina	Oriskany	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Lockport		
RESULT	22,444 Mcf Nat. 1,970 psi/36 hrs. Gas Storage Aransas Five Forks Field	Trenton 7930 Berkman town-8967 Mines-10,950 NSOG Abandoned Wildcat	Salt 7705 NSOG Abandoned Wildcat	Dry in Oriskany plugged back 168 Mcf AF 660 psi/38 hrs. in U. Dev. sands Dis. Salt Run Pool	N50G 5W filled up 4,500'. Abandoned East Emporium Field	1,950 Mcf Nat. 31,100 psi/14 days Discovery Canoe Run Field	N50G Abandoned East Emporium Field	N50G 25 psi/12 days Abandoned Wildcat	N50G 3 Mcf AF 5400 psi/12 days Abandoned Wildcat				

Table 14. (Continued)

SUMMARIZED RECORDS

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COUNTY	Permit Number	Elk 308	Elk 324	Elk 307	Elk 306	Erie 349	Erie 50	Erie 346	Erie 347	Erie 348	Erie 345
NAME OF WELL	Penn Gas ANF #1-282	Sylvania Corp. (mineral rights)	UNG-ANF #1-281	UNG-Stackpole #1-280	A. & E. Freeman	Alvin A. Kosiak	Joseph R. McLaughlin #1	Joseph R. McLaughlin #2	C. & P. Neuburger #1	Joseph Orschek #1	Earl H. Linn et.al
OPERATOR	Earl H. Linn et.al	Fairman Drilling Co.	Earl H. Linn et.al	Earl H. Linn et.al	Pennsylvania Gas Co.	Pennsylvania Gas Co.	Pennsylvania Gas Co.	Pennsylvania Gas Co.	Pennsylvania Gas Co.	Pennsylvania Gas Co.	Earl H. Linn et.al
TOWNSHIP	Spring Creek	Ridgway	Jones	Benzinger	McKean	McKean	McKean	McKean	McKean	McKean	Northeast
QUADRANGLE	Halton C 4	Ridgway D 6	Kane 1 2	Croft G 5	Erie 6 118	Erie 6 119	Erie 6 117	Erie 6 117	Cambridge 5pgs. A 24	Cambridge 5pgs. A 25	North East F 31
LATITUDE	25,900 ft. S 41°30'	19,600 ft. S 41°25'	10,500 ft. S 41°35'	28,900 ft. S 41°35'	29,900 ft. S 42°05'	27,900 ft. S 42°05'	29,950 ft. S 42°05'	29,950 ft. S 42°05'	200 ft. S 42°00'	200 ft. S 42°00'	3,300 ft. S 42°10'
LONGITUDE	19,800 ft. W 78°45'	22,600 ft. W 78°40'	1,100 ft. W 78°45'	1,150 ft. W 78°25'	1,350 ft. W 80°10'	2,600 ft. W 80°10'	3,675 ft. W 80°10'	3,700 ft. W 80°10'	6,500 ft. W 80°10'	16,600 ft. W 79°45'	16,600 ft. W 79°45'
DATE COMPLETED	2-20-73	9-20-73	11-26-72	11-7-72	2-5-73	5-25-73	1-19-73	1-25-73	1-31-73	9-17-72	
ELEVATION	1582 GR	2230 KB	2049 KB	1912 KB	980 KB	956 0F	994 KB	1024 KB	973 KB	1430 KB	
TULLY	*5950-5940	*5633-	*5482-5910	*5792-5950	*1715-	*1663-	*1685-1770	*1746-1832	*1673-1758	*2025-2090	
ONONDAGA LIMESTONE	5875-5938	6293-	5914-5946	6302-6349	1936-	1867-	1905-2175	1967-2246	1901-2186	2264-	
CHERT											
DRISKAN	absent	absent	absent	absent	2216-2225	2147-2160	2175- Gas	2246-2250	2186-2198	2496-2506	
HELDERBERG		6359-		6349-Gas 6364	2225-	2160-		2250-	5,000 2192		
KEYSER-BASS ISLAND SALINA		6447-Gas 6502-	6040-						2198-		
GUELPH - LOCKPORT								2650-		2978-	
CLINTON IRONDEOUQUA									3089-		3293+
MEDINA WHIRLPOOL									3116-		3348-3438
QUEENSTON									3281-		Gas 340-3484
TOTAL DEPTH	6055	8202	6310	6462	2274	2175	2187	3323	2237	6059	
DEEPEST FORMATION REACHED	Helderberg	Salina	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Queenston	Helderberg	Gatesburg	
RESULT	Completed as gas well in upper Devonian Dry Devonian Wildcat Discovery - Boot Jack Pool, Horton Field	412 Mcf Nat. 531 Mcf AF in Upper Devonian Dry Deepener Pool Wildcat Mill Creek Field	83 Mcf Nat. 306 Mcf AF 1,800 psi/4 hrs. Discovery - Boot Jack Pool, Horton Field	4,000 Mcf Nat. 306 Mcf AF 1,800 psi/4 hrs. Discovery Benzinger Wildcat Mill Creek Field	NSOG Abandoned McKean Field	Est. 15,000 Mcf Nat. 800 psf/16 hrs. Discovery Benzinger Wildcat Mill Creek Field	556 @ 1296 Abandoned McKean Field	N506 Abandoned McKean Field	Trenton-5247 Gatesburg-6018 1,214 Mcf AF 1,030 psf/14 days Discovery Bull Reservoir Field		

Table 14. (Continued)

MAP NUMBER	COUNTY Permit Number	Forest 898	Forest 903	99	Fulton 5	Indiana 1377	96	Indiana 2038	95	Jefferson 989	86	McKean 10183	65	McKean 10397	67	McKean 10394	68
NAME OF WELL	Collins-Clinger #1-290	Collins-Clinger #1-293	Kermitt Mallott #1	Oaks Point Realty #1	A. 5, Missinger #3	Nars-Jung #1-289	Keweenee Oil #3	Keweenee Oil #4	Keweenee Oil #1	Onofrio #1	McKean 10183	Keweenee Oil #1	65	McKean 10397	67	McKean 10394	68
OPERATOR	Earl H. Linn et.al.	Earl H. Linn	Consol. Gas Supply Corp.	James Orfilling Co.	Peoples Natural Gas Co.	Earl H. Linn et.al.	Felmont Oil Corp.	Felmont Oil Corp.	Felmont Oil Corp.	Federal Oil & Gas Co.	McKean 10183	Felmont Oil Corp.	65	Onofrio #1	67	McKean 10397	68
TOWNSHIP	Kingsley	Green	Belfast	Burrell	E. Mahoning	Heath	Corydon	Corydon	Corydon	Corydon	McKean 10183	Corydon	65	Onofrio #1	67	McKean 10397	68
QUADRANGLE	Sheffield G 5	Tionesta C 1	Needmore E 4	New Florence A 21	5mickburg I 36	Marienville F 3	Kinzua 8 20	Kinzua 8 21	Kinzua F 22	Kinzua I 19	McKean 10183	Kinzua F 22	65	Onofrio #1	67	McKean 10397	68
LATITUDE	3,650 ft. S 41°35'	5,250 ft. S 41°30'	7,400 ft. S 39°55'	28,900 ft. 40°30'	23,150 ft. 40°50'	28,250 ft. 41°25'	16,300 ft. 42°00'	10,100 ft. 42°00'	13,100 ft. 41°55'	19,100 ft. 41°50'	McKean 10183	19,100 ft. 41°55'	65	Onofrio #1	67	McKean 10397	68
LONGITUDE	18,650 ft. W 79°10'	12,150 ft. W 79°15'	9,200 ft. W 78°05'	7,450 ft. W 79°10'	8,300 ft. W 79°00'	850 ft. W 79°00'	9,000 ft. W 78°50'	3,800 ft. W 78°50'	12,550 ft. W 78°45'	10,500 ft. W 78°45'	McKean 10183	10,500 ft. W 78°45'	65	Onofrio #1	67	McKean 10397	68
DATE COMPLETED	4-4-73	5-11-73	11-28-72	1-7-73	5-6-73	6-25-73	9-12-73	10-8-73	11-24-73	1-2-73	McKean 10183	1-2-73	65	Onofrio #1	67	McKean 10397	68
ELEVATION	1605 ft 4800-	1666 ft 4800-	917 ft 5018-	1806 ft *3200-3350	1650 ft 7470-	1384 ft *6805-	2108 ft *5165-	1790 ft *4000-4008	1738 ft *3683-3691	1495 ft 3998-4075	McKean 10183	1495 ft 4300-4355	65	Onofrio #1	67	McKean 10397	68
TULLY	*4490-4525	*4740-		6760-	*7438-7452	7459-7469	5570-	4312-4384	3998-4075	3975-	McKean 10183	3975-	65	*4044-4052	67	McKean 10397	68
ONONOAGA LIMESTONE CHERT											McKean 10183		65	4450-4495	67	McKean 10397	68
ORISKANY	absent	absent		3350-3475	7580-7600	7568-7579	absent	4384-Gas	4075-5.W.	4355-	McKean 10183	4355-	65	4495-4520	67	McKean 10397	68
HELOERBERG	4850-	5135-	3475-	7658-	7579-	5626-					McKean 10183		65		67	McKean 10397	68
SALINA	4985-	5272-					5760-				McKean 10183		65	4608-	67	McKean 10397	68
GUELPH - LOCKPORT	5835-	6140-					7200-7250	556 7200			McKean 10183		65	5420-	67	McKean 10397	68
CLINTON											McKean 10183		65		67	McKean 10397	68
MEOMA		6610-							7625-		McKean 10183		65		67	McKean 10397	68
QUEENSTON		6770-									McKean 10183		65		67	McKean 10397	68
TOTAL DEPTH	6030	6851	3550	7695	7710	7725	4386	4090	4385	5450	McKean 10183		65		67	McKean 10397	68
DEEPEST FORMATION REACHED	Lockport	Queenston	Helderberg	Helderberg	Helderberg	Medina	Oriskany	Oriskany	Oriskany	Oriskany	McKean 10183		65		67	McKean 10397	68
RESULT	5430 Abandoned Deeper Pool Wildcat 1500 ft Abandoned Baltown Field	5450 556 6715 1,250 Mcf & Wildcat 1500 ft Abandoned Baltown Field	506 New Field Wildcat Abandoned	506 Deeper Pool Wildcat Blacklick Field	506 U. Gov. production Wildcat Blacklick Field	506 1,200 Mcf Nat. Wildcat 750 psi/6 days Wildcat Blacklick Field	McKean 10183	506 1,200 Mcf Nat. Wildcat 750 psi/6 days Wildcat Blacklick Field	65	5450 Abandoned Deeper Pool Wildcat Buck Lick Field	67	5450 Abandoned Deeper Pool Wildcat Buck Lick Field	68				

SUMMARIZED RECORDS

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Table 14. (Continued)

MAP NUMBER	79	75	76	82	81	
COUNTY PERMIT NUMBER	Susquehanna 6	Tioga 60	Tioga 56	Venango 2253	Venango 2258	Venango 2166
NAME OF WELL	H. Wesley Pease Unit #1, Wn-1282	Pa. Tract 195 #1-rA	5 & 5 Coal Co. #1	William F. Duncan #1	Paul L. Hovis #1	Charles F. Mueller #1
OPERATOR	Shell Oil Co.	Consol. Gas Supply Corp.	Amoco Production	Peoples Natural Gas Co.	Peoples Natural Gas Co.	Peoples Natural Gas Co.
TOWNSHIP	Harford	Morris	Morris	Irwin	Irwin	Irwin
OUAORANGE	Susquehanna G 1	Anttrim 0 17	Antrim F 16	Hilliards A 5	Hilliards A 6	Hilliards A 3
LATITUDE	20°250' N 41°50' E	18,600 ft. S 41°40' E	13,600 ft. S 41°40' E	25,900 ft. S 41°15' E	2,500 ft. S 41°15' E	700 ft. S 41°15' E
LONGITUDE	8,500 ft. W 75°40'	8,650 ft. W 77°25' E	13,250 ft. W 77°15' E	20,750 ft. W 79°55' E	16,750 ft. W 79°55' E	14,500 ft. W 79°55' E
DATE COMPLETED	10-7-73	8-24-73	1-30-73	4-5-73	3-10-73	2-12-73
ELEVATION	1248 kB	2055 kB	1284 kB	1468 kB	1523 kB	1486 kB
TULLY	4420-	*6264	*6252-	*4498-	*4322-	*4295-
ONONOAGA LIMESTONE	6848-	7226-	7235-7260	4709-4742	4527-4553	4519-
CHERT			4742-4836	4543-	4553-	
ORISKANY		7251-	7260-7295	4836-	469-(Horizon)	absent (Horizon)
HELDERBERG	7295-	7285-	7295-		4650-	4637-
KEYSER-BASS ISLAND SALINA			7500-7580	4925-5037-	4740-4852-	4706-4819-
GUELPH - LOCKPORT			7580-		4830-	
CLINTON IRONOEQUIS				5895-	5659-	5620-
MEDINA WHIRLPOOL					5976-	5930-
QUEENSTON					6214-	6234-
TOTAL DEPTH	8534	7312	10,284	6608	6552	6510
DEEPEST FORMATION REACHED	Salina Salt	Helderberg	Queenston	Queenston	Queenston	Queenston
RESULT	5alt 8454 NSOG	N5OG	N5OG Abandoned New Field Wildcat	6,866 Mcf Nat. 5,600 Mcf AF 1,600 psi/1 day	2 Mcf Nat. 500 Mcf AF 1,625 psi/1 day	566 Nat. 3 Mcf AF 600 psi/1 day
	Abandoned New Field Wildcat			Deeper Pool	Deeper Pool	Irwin Pool
				Discovery	Produced	Irwin S.W.